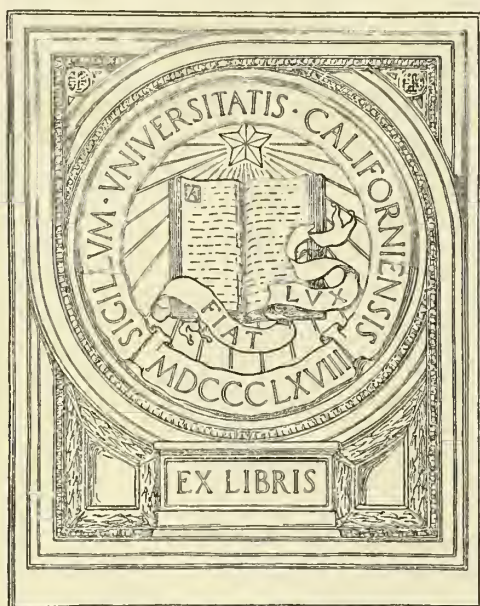


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MINNESOTA MEDICINE

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No. 1

CORRELATIVE VALUE OF CLINICAL AND PATHOLOGICAL FINDINGS IN ROENTGEN DIAGNOSIS*

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Saint Paul

LIKE many other methods of diagnosis in medicine, roentgen diagnosis is of relative value and cannot always be definite and final. It may be indefinite or doubtful and occasionally entirely impossible. Fortunately, thanks to the ever increasing precision in technic and to the availability of well trained roentgenologists, diagnostic difficulties have been greatly reduced. The training, experience and knowledge of the examiner, good and careful technic and sufficient clinical data all contribute materially and often decisively toward the solution of the doubtful and to even solve the apparently impossible. On the other hand, a positive diagnosis by the most experienced and careful may, at times, be found erroneous. For, after all, roentgen diagnosis depends upon the interpretation of shadows of various densities on the screen or the photographic film and not at all on the actual demonstration of the object for diagnosis. Often, at best, it represents the expression of the judgment based upon the knowledge and experience of the examiner. Herein lies the fundamental difference between the diagnosis by means of x-rays and that through pathological methods. The exactitude which may often be imposed upon the latter cannot always be expected of the former, although the precision of the present day roentgen diagnosis is often amazingly accurate and, frequently, almost uncanny in the hands of the experienced. In all cases, the best roentgen opinion would likely be obtainable when the roentgenologist, trained in clinical medicine and versed in pathological anatomy, is given the place of a consultant and the privilege of an access to

all available clinical data, a careful analysis of which is often essential in the rational interpretation of the roentgen findings.

An attempt will be made to briefly present the following case reports, which have been gathered from the archives of a hospital laboratory, representing several hospital diagnostic services, in order to illustrate and to emphasize the value in diagnosis of correlation of the clinical and pathological data with roentgen findings, together with such pertinent remarks as may be indicated for further elucidation of this subject.

The lack of time necessitates the omission of all photo-micrographs from this presentation.

The cases will be divided into several groups, each illustrating a simple, fundamental, practical lesson in the broad field of medical diagnosis of which roentgenology is a major part.

Group I (illustrated by Cases 1 and 2). A very distressing experience may come to a roentgenologist when a request is made by the attending physician for a superficial or hurried examination of a patient or, as the common expression goes, "just to look at him," in order that the time, the trouble and always the expense of the examination may be minimized for the patient by this short cut method of examination. By acquiescing to such a request and literally attempting to carry it out, the roentgenologist may occasionally find himself in a most embarrassing position. It should be the policy of every roentgenologist, never to allow himself to modify his established course of technical procedure except under the most extreme circumstances.

Case 1.—E. W., male, age fifty-one. Chief complaints: Paroxysmal cough, shortness of breath and cyanosis. History of chronic gastric ulcer of twenty to forty years' standing (roentgen diagnosis of gastric ulcer

*From the Chas. T. Miller Hospital and the Amherst Wilder Dispensary, Saint Paul. Presented before the Radiological Society at the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 22, 1933.

eight years ago). Roentgenograms of the chest: Chronic non-tuberculous interstitial pneumonia or diffuse infiltrating type of metastatic carcinoma. Attending physician's request: "Fluoroscope his chest; give him a few swallows of barium and peek at the stomach without letting the patient know, since he absolutely refuses to have the stomach examined." Result: Negative; no plates taken. Autopsy: Lungs, diffuse metastatic carcinoma throughout. Stomach, a small carcinoma in the pyloric antrum.

Case 2.—L. H., female, age sixty-four. Chief complaints: Loss of appetite, nausea, loss of weight, weakness, fast pulse, nervousness, marked emaciation. No food distress. No palpable glands. Nodular thyroid, tremor, pulse 110. Basal metabolism, plus 35 per cent. Blood smears negative. Fluoroscopy of the stomach, without plates (by the attending physician), twice negative. Thyroidectomy. Basal metabolism remained elevated (plus 59 per cent). Autopsy: Leukemic infiltration of the stomach, the thyroid gland and other visceral organs.

Group II (illustrated by Case 3). Somewhat an identical situation may arise when the patient, found in a critical condition and unable to cooperate with the examiner, may present what may be roentgenologically considered a definite lesion, supported by the clinical findings, only to be found entirely erroneous at the autopsy table. It is well that a guarded diagnosis be rendered in those cases where the patient is found to be too ill for thorough investigation.

Case 3.—F. V., female, age sixty-four. Chief complaints: Sudden onset of complete dysphagia at breakfast; marked cyanosis and inability to talk; being treated for cardiac decompensation. Clinical diagnosis: Carcinoma of the esophagus with obstruction. Roentgen diagnosis: Apparent complete obstruction of the proximal portion of the esophagus at the level of the third and fourth cervical vertebrae.

Autopsy: Hypertension heart, 530 grams. Chronic passive congestion of the lungs and liver. Normal esophagus. No foreign body in the esophagus.

Group III (illustrated by Cases 4 and 5). Often are the moments of embarrassment and surprise to the clinician who fails to make a correct clinical diagnosis or to carefully search for the cause of the present illness, before a radical procedure is undertaken, only to resort to the belated x-ray examination after the irreparable mistake has been committed. This, again, emphasizes the imperative necessity of the most painstaking attempt to eliminate all diagnostic possibilities, by every available measure at our command in order that the patient may be spared an unnecessary radical procedure.

Case 4.—H. R., male, two years of age. Chief complaints: Abdominal enlargement began about four months ago, occasional abdominal pain, marked anorexia. No vomiting. Abdominal tap without results. Diagnosis: Celiac disease or abdominal tumor. The abdomen varied in size from time to time, was doughy in consistence, with more fullness in the right lower quadrant. X-ray of the abdomen negative. Gastrointestinal tract negative. The mass in the pelvis displaced the cecum upward.

Laparotomy: Found what appeared to be a dilated urinary bladder. Injection of the urinary bladder during convalescence with an opaque medium revealed a marked dilatation of the ureters and renal pelvis, due probably to a congenital obstruction of the urethra.

Case 5.—Baby S., male, three weeks old. Chief complaints: Vomiting, a mass in the lower abdomen. Distention of the abdomen with prominent superficial veins. A mass palpable in the pelvis, rising up to the umbilicus; 280 c.c. of cloudy urine obtained through catheter.

Roentgen examination: Sodium iodide injection into the urinary bladder which revealed a marked redundancy and dilatation of the ureters. Post-mortem injection demonstrated a valve in the posterior urethra and a marked dilatation of the renal pelvis as well as the ureters.

Autopsy: A membranous valve obstructing the prostatic urethra. A marked dilatation and tortuosity and hypertrophy of both ureters and hydro-pyonephrosis of both kidneys and pyonephritis of the right kidney.

Group IV (illustrated by Cases 6, 7, 8, 9, and 10). Not infrequently, an error in diagnosis may be committed because of the failure, justifiable or otherwise, of the clinician to locate the primary site of a malignant neoplasm. Symptoms are often only referred to the metastatic process, which, too, may not be recognized or diagnosed. It is a common and well known practice to make a clinical diagnosis of arthritis or rheumatism and so treat the patient when a roentgenogram may reveal metastatic carcinoma in the bone or a careful physical examination may elicit a small lump in the breast. Large ovarian carcinomas have been removed without first having a roentgen study of the gastro-intestinal tract made, only to discover postoperatively or at autopsy that the primary was in the stomach. Enormous, massive, metastatic carcinoma of the liver has been seen, from time to time, in which the primary proved to be an insignificant lesion in the stomach. Parallel clinical pictures in various malignant tumors have been encountered by every practitioner of medicine.

Case 6.—E. S., female, age fifty-five. First treated for arthritis of the knees without roentgenograms. Breast

cancer recognized and removed a few months later, but no search was made for skeletal metastasis. Generalized skeletal as well as visceral metastasis and death two years later.

Autopsy: Extensive cancer metastasis about the bones of the knee joints as well as all other bones.

Case 7.—M. S., female, age forty. First treated for sciatic rheumatism. Roentgenograms of the pelvis were taken but the metastatic lesions were not recognized by the clinician. Six months later, breast cancer was recognized. Generalized bony and visceral metastasis and death.

Autopsy: Generalized carcinomatosis.

Case 8.—H. Q., female, age fourteen. Admitted as a case of tuberculous spondylitis with double knuckles. Roentgenograms of the lungs were diagnosed as pulmonary tuberculosis. Roentgenograms of the spine showed a destruction and flattening of the eighth dorsal and the third lumbar vertebrae with peculiar moth-eaten rarefaction of the bones of the spine, pelvis and femurs. The grandmother then called the attention of the physician to the fact that she had received a blow on the right breast about six months before, followed by the development of a painful lump. Examination now revealed a large, irregular, hard mass in the right breast with enlargement of the axillary nodes and another mass in the left breast. Biopsy of the axillary node revealed a metastatic carcinoma. Autopsy: Generalized carcinomatous metastasis including the bony system and the lungs. Primary in the right breast.

Case 9.—M. E., female, age sixty-five. Enlarging abdomen with fluid. Palpable masses in the pelvis. Operative removal of bilateral solid ovarian tumors, microscopically diagnosed as metastatic cancer (Kruckenberg type).

An x-ray examination of the stomach, during the convalescent period, revealed diffuse carcinoma involving the pyloric antrum. No autopsy.

Case 10.—M. J., female, age forty-three. Enlarged masses in the pelvis. Operative removal of tumors, diagnosed as cancer. Persistent gastric distress which was ignored by the surgeon. An x-ray examination of the stomach later revealed a filling defect at the pylorus, with retention. Autopsy confirmed the diagnosis of cancer of the pyloric portion of the stomach.

Group V (illustrated by Case 11). Sometimes, the attending physician may be so positive of the diagnosis in a given patient who has been under his care for many years for the recurring attacks of the same complaints that he neglects to resort to an x-ray examination for further enlightenment and confirmation which would be done without hesitation for another patient, presenting the similar complaints. Regardless of how easy and reasonable the clinical diagnosis may seem to be, a careful roentgen study is always indicated, if the same clinical picture persists from year to year in spite of the treatment.

Case 11.—W. S., male, age nineteen. Recurrent abdominal pain and vomiting since childhood, diagnosed as tetany and as spasmophilia. Present diagnosis, gastric tetany with persistent vomiting. Various forms of anti-spasmodic were given. Blood calcium, 7 mg. Surgical consultant requested an x-ray examination of the gastro-intestinal tract. X-ray finding: Complete obstruction at the duodeno-jejunal junction with an enormous dilatation of the duodenum. Autopsy: Volvulus of the duodenum with obstruction, on the basis of a congenital anomaly of the transverse mesocolon and of the origin of the superior mesentery and a mobile cecum and ascending colon.

Group VI (illustrated by Cases 12, 13, 14, and 15). An apparent agreement between the roentgen diagnosis and the clinical observation should not prevent the clinician from obtaining a further corroboration, either by biopsy or by autopsy. Our vital and morbidity statistics would be more reliable if the physician would obtain autopsy confirmation before the final diagnosis is rendered or the death certificate is signed. Exploration may often be justified on this ground.

Case 12.—O. M., male, age seventy-one. Presented himself in November, 1921, complaining of continuous dull pain in the stomach which had been present, then, for many years. Gastric retention with a filling defect in the duodenal cap found by x-ray.

Laparotomy showed a large mass obstructing the pylorus: enlarged regional nodes. Gastro-enterostomy was done. Diagnosis: Cancer of the stomach. Improvement. Palpable regional nodes in axilla, developed in January, 1930. Biopsy report: Leukemic lymph node. Blood picture normal. Death from cardiac failure.

Autopsy: Leukemic infiltration of the stomach, regional lymph nodes, liver, spleen and kidneys.

Case 13.—M. J., female, age seventy-one. Chronic diverticulitis of the sigmoid with obstipation and pain for six years. Palpable tumor, possibility of cancer, in the pelvis.

X-ray examination: Multiple diverticuli of the sigmoid with a partial obstruction in the sigmoid. Colostomy was done.

Autopsy: Chronic diverticulitis with perforation and abscess formation. Peri-diverticulitis. Obstruction of the sigmoid due to adhesions and kink.

Case 14.—L., male, age sixty-five. Chief complaints: Bleeding from the rectum and pain in the abdomen. X-ray examination: Multiple diverticuli in the sigmoid; no obstruction. Proctoscopic examination was negative. Diagnosis: Multiple diverticulitis. Four months later, obstruction of the sigmoid. Biopsy through proctoscope: Adenocarcinoma. No autopsy.

Case 15.—R., female, age forty-five. Diabetic. Palpable mass in the left kidney area with pain and hematuria. Pyelogram: Renal tumor of unknown type. Nephrectomy. Pathologic report: Peri-renal organized hematoma. Recovery.

Failure of the roentgenologist has resulted, not infrequently, through his failure or inability to be present at the time the roentgenograms are taken by the technician, who merely follows the instruction on the request blank. The presence of the roentgenologist is often essential in the production of diagnostic roentgenograms. The present practice of a roentgenologist directing several hospital x-ray departments, in addition to looking after his own private practice, while the best arrangement available at the present time, is not without its advantages. Under this system, there has been a tendency to place too great a responsibility upon the non-medical technician in charge in matters entirely foreign to his sphere of activity. In fact, there have been reported instances where the non-medical technician in charge (nominally under the supervision of a recognized roentgenologist) is so trained in diagnosis as well as in technic, that, in the absence of his chief, he actually makes diagnoses, writes

reports, and offers expert advice to the referring clinicians who, in turn, accept such diagnoses and advice, more or less, as a matter of approved practice. All of which serve only to the detriment of the practice of roentgenology.

In conclusion, may I say that this presentation was prompted by the desire to show, by reciting instances of failure and mistake, either on the part of the clinician or the roentgenologist, that the maximum efficiency in diagnosis is obtainable only through the unreserved coöperation and interdependency between the clinician, the pathologist and the radiologist, an oft proclaimed doctrine which, nevertheless, is too frequently forgotten, alike by the attending physician and by those representing these two major specialities; and that there is a limitation, at times, in roentgenologic methods of diagnosis, the full appreciation of which may strengthen, rather than weaken, the place of roentgenology in the practice of medicine.

POSTOPERATIVE PERITONEAL ADHESIONS: CAUSES AND PREVENTION*

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Minneapolis

POSTOPERATIVE peritoneal adhesions are the *bete noir* of the abdominal surgeon. Nevertheless, if it were not for the fact that nature rallies to the defense of the organs within the abdominal cavity by the formation of adhesions, greater functional damage to these organs would occasionally occur (Fig. 1).

Primary adhesions usually follow some disease occurring in or around:

(1) The gallbladder and liver, from stones or infection; (2) stomach and duodenum, from ulcer or cancer; (3) appendix because of infection (Fig. 2); (4) intestine, colon and rectum, from inflammation, diverticulitis, cancer or tuberculosis; (5) bladder, from cystitis; (6) uterus, tubes and ovaries, from infection, new growth and pressure. Adhesions when found associated with these organs may have prevented microbic invasion of the peritoneal cavity and a general peritonitis.

In performing a laparotomy upon a patient in whom a previous abdominal section has been made, adhesions will often be found, the omentum or loops of the bowel being glued together or to the abdominal wall, uterus, ovary, bladder, sigmoid, or rectum. No doubt many of these could have been prevented had a more thorough primary operation been performed, with eradication of all of the infected tissue and the careful exclusion of the traumatised area from the pressure of contiguous infected intestine by peritonealizing these areas.

It is not unusual for physicians to attribute symptoms which cannot be traced to any actual disease within the abdomen to adhesions, especially when the person has had a previous laparotomy.

In an article written several years ago on "Intestinal Adhesions" the author stated that adhesions often follow laparotomies from the use of antiseptics within the abdomen, unnecessary

*Read before the Minnesota Academy of Medicine, March 8, 1933.

handling, denuded areas, hemorrhage, and infection.

There are many surgeons who are of the opinion that there is a special tendency on the part

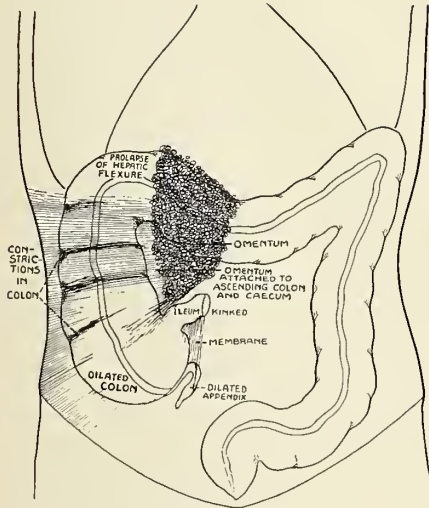


Fig. 1.

of some individuals to develop postoperative peritoneal adhesions while in others there is a proteolytic enzyme that seems more active in digesting the adhesions.

Ochsner and Garside¹³ believe that a proteolytic ferment is liberated from the polymorphonuclear cells which digests the adhesions when they have served their purpose, but that in some individuals there is an inherent tendency toward the development of fibrous tissue—an “adhesion diathesis” and “keloid tendency” in which the adhesions are apt to re-form. From certain experiments they found that if saline was put in the abdominal cavity after the separation of adhesions, few or no adhesions would form in 13.32 per cent of cases and if trypsin or papain solution were added few or no adhesions were formed in 42.28 per cent and 90.89 per cent, respectively.

Kelly and Noble⁸ state that certain individuals have a tendency to develop these adhesions as some do keloids.

Ladwig¹⁰ does not think that trauma alone is responsible for adhesions and that the phagocytic action of proteolytic enzymes is responsible for the absorption of adhesions. Is it not possible that this proteolytic enzyme may absorb adhesions within the abdominal cavity unless there still remains some infection such as that residing

in a loop of intestine that continues the infectious process and perpetuates the adhesions?

Haberland⁵ says “it is difficult to prove that there is a constitutional disposition towards the

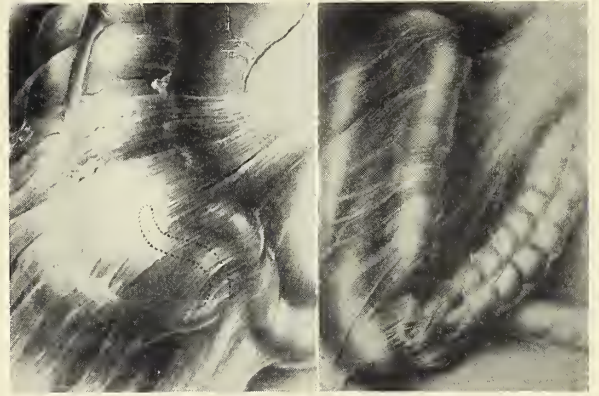


Fig. 2 (left). Adhesions around appendix because of infection. Fig. 3 (right). So-called Jackson's veil. Note double gunshot barrel arrangement of ascending and transverse colon.

formation of abdominal adhesions,” but it is often an excuse of the surgeon for adhesions following operations.

The opinion was expressed by the author in an article² published in 1911 that the use of non-absorbable or chemically treated suture material, especially if left exposed in the abdomen, is responsible for adhesions. According to experiments, silk or linen sutures caused the most adhesions, chromic catgut was next, but when plain catgut was used alone or to cover the other sutures and careful technic was employed, few adhesions resulted. The non-absorbable sutures sooner or later found their way into the intestinal canal, but the adhesions left were firm and fibrous and persisted.

Mueller and Rademacher¹² conducted some important experiments on guinea pigs and found that when an abdominal incision was packed with sterile gauze, no adhesions resulted in any of the ten cases. Adhesion resulted in one case in ten when the wound was packed with gauze soaked in 5 per cent iodine, while adhesions occurred in six out of ten cases when the wound was packed with gauze soaked for twenty-four hours in a culture of *B. coli*, the adhesions extending into the muscles of the bowel.

These experiments show definitely that infection will travel through the peritoneum to the abdominal cavity and involve the contiguous tissue. We know it will travel through the walls

of a diseased appendix and involve the surrounding structures. An abdominal abscess may destroy the parietal peritoneum and even find its way to the skin surface. Infection will travel through any portion of the wall of the intestine when the peristaltic action is long interfered with.

We have all observed the so-called Jackson's veil, a thin vascular membrane on the ascending colon and cecum. A mild form of this membrane has been found in the newborn. Could not such a membrane present in infancy be the primary cause of persistent constipation and stasis, and later result in a more definite disabling membrane? A pronounced form of this membrane has been found involving the cecum, appendix, ascending and sometimes the transverse colon. Occasionally it might constrict certain regions of the colon and even cause obstruction. The hepatic flexure would be accentuated, and at times a double gunshot barrel arrangement of the ascending and the transverse colon would be seen (Fig. 3). Sometimes the cecum as well as the ascending colon would be greatly dilated.

The origin of this inflammatory reaction evidently comes from within the colon and no doubt these membranes or adhesions are protective in nature. The greater the constriction because of the bands, the more the stasis and the more infectious are the contents of the bowel, and the greater the inflammatory reaction without the colon, necessarily then, the greater the number of adhesions following—establishing a vicious circle. Should a laparotomy be performed upon a person in such a state postoperative adhesions are inevitable.

If, to intestinal infection, are added ingested microorganisms from diseased tonsils, teeth or sinuses or those gaining entrance from a diseased gallbladder, the infection within the alimentary canal is greatly augmented, increased inflammatory processes occur and peritoneal adhesions follow, especially after a laparotomy.

I have a number of patients who have had these protective adhesions interfere considerably with the function of the bowels. Some were not cured until all foci of infection, *i.e.*, infected teeth, tonsils and sinuses, were cleaned up. From this experience I have concluded that such foci have much to do with the cause of the perpetuation of peritoneal postoperative adhesions.

No doubt there are many causes for postoper-

ative peritoneal adhesions, any one or more of which may be responsible in an individual case. It is difficult to demonstrate that the fault lies in the lack of a proteolytic enzyme in the patient that is capable of digesting adhesions.

Time should be taken to get the patient in good condition for operation unless an emergency exists. The intestinal tract and all organs directly connected with the function of or in contact with the alimentary canal should be investigated. The normal tone and activity of the bowels, especially of the colon, should be attained, if possible, before the operation is performed.

The influence of infectious foci on the health of the gastro-intestinal tract and their relation to pericolic adhesions has been related in a former article by the writer.⁴ I am convinced that to get the best results and avoid adhesions is to negate that influence.

An anesthetic should be given so that there is complete relaxation of the abdominal wall and no harm done to the peritoneum from straining, coughing, or vomiting.

The skin must be thoroughly cleansed but the intestines should not come in contact with any irritating chemical on the skin while operating. Strong chemicals may destroy the endothelial cells and promote adhesions.

The position of the patient should be such that the abdominal muscles are relaxed and the intestines gravitating away from the field of operation.

The incision should be over the most convenient portion to get at the diseased area, avoiding injury to the nerve supply, and sufficiently large for good exposure and complete, careful work.

Powder or chemical solutions on gloves are irritating to the peritoneum. The gloves should be thoroughly washed with sterile water before operating and should be changed at once if punctured or torn.

Dry gauze packs are irritating, warm moist ones are less so, but hot ones are very harmful. Undue crowding of intestines against the pack while the patient is straining or vomiting may injure the peritoneum. Also denudation may occur if the packing is removed roughly.

Percy¹⁴ holds up the edges of the wound with the gloved hand while packing.

A rubber sheet for packing is less irritating, prevents the loss of heat and exposure to air and

is cleaner. Gauze may leave particles of lint which damage the peritoneum and invite adhesions.

Warm wet sponges should be used and rubbing avoided.

Long exposure of the peritoneum to heat, light, and air is harmful. The peritoneum soon dries out and the cells may not readily recover.

Prolonged and firm automatic retraction with wire or narrow bladed retractors, or scraping the peritoneum with rough hand retractors causes cell destruction and therefore should be interdicted.

Care should be observed to avoid pressing within the abdomen with instruments or grasping the intestines or peritoneum, especially at the wound margins, with instruments. The ready threaded atraumatic needles are best used for suturing intestines or peritoneum, as we know the peritoneum may be torn when the usual large eye needles are used. The intestine may become fixed at that point and infect the area thus traumatised.

It is best to avoid unnecessary separation of adhesions around an infected area. To wall off well and evacuate pus by using the suction apparatus is a safer practice. If the operation can be performed when the inflammatory process is subsiding there is less chance of extension with multiple adhesions following.

In performing a salpingectomy all of the infected tissue should be removed by dissecting out the corneal portion and covering this area well with the broad and round ligaments. Adhesions can also form around a long appendiceal stump or a portion of an infected ovarian cyst.

We should correct associated diseases within the abdomen when possible. When it is necessary to correct a displacement of the uterus it is wise to remove an appendix if there is any sign of trouble present. When a disabling membranous pericolicitis exists with a diseased appendix, it should be attacked simultaneously unless the appendicitis is too acute.

Irritating chemicals are harmful. The peritoneum is less resistant than the infectious microorganisms; therefore, the chemicals are worse than useless as they may do irreparable harm to the peritoneum and promote adhesions.

Healthy contiguous peritoneal tissues do not form adhesions. When raw, traumatised, or chemically treated areas and non-absorbable

suture lines are covered by transplantation of a contiguous healthy peritoneum or omentum, harmful adhesions are not likely to occur (Fig. 4). This method is always practiced by Baldwin.¹

It is best to cut adhesions instead of rubbing

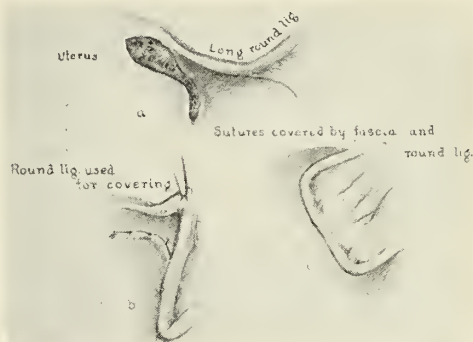


Fig. 4. Peritonization following suspension of the uterus, combined with removal of the tube and ovary.

them off and to cover and turn in all the cut edges with a fine plain catgut suture. Adhesions around tuberculous or malignant disease are best separated by the use of the diathermy cautery. A fairly deep cauterization leaves fewer adhesions than a superficial one and is more suitable than the knife for removing the disease.

In case of inevitable adhesions the viscera should be replaced where the functions will be best performed.

Blood is a very good culture medium. Clots left in the abdomen favor adhesions when they become infected. All bleeding vessels should be secured by catgut ligature.

It is best to drain infected areas adequately with Penrose drains assisted by gravity when possible, namely, by turning the patient onto the abdomen where abdominal abscesses are present. These drains are less harmful than pus retained under pressure. Without drainage diffuse peritonitis is possible. The pus may be forced into other areas and a wide range of adhesions follow. We should avoid gauze drains and undue pressure from firm rubber drainage tubes.

Chemically treated suture material and non-absorbable sutures should not be used in abdominal operations unless peritonealization is employed, using fine plain catgut for the work. The outer suture of the intestine should be of plain catgut with an atraumatic needle (Fig. 5).

The intra-abdominal use of saline solution is considered by most surgeons an aid in preventing adhesions. It is of doubtful value, but may do no harm.

Vaseline and oil have been used with the hope of temporarily preventing adhesions between

abdomen of the human being. He states that this fluid should be reserved for clean cases and the effectiveness is conservatively estimated to be 70 per cent.

Lacey⁹ in his last report concludes that:

1. "Amniotic fluid is apparently harmless when introduced into the peritoneal cavity.
2. "It would seem to lessen the ooze from denuded surfaces and stimulate the peritoneum to a more powerful defense reaction.
3. "It cannot be depended upon to prevent adhesions, although it possibly does modify their density."

Mann¹¹ in a personal communication states: "I am not sure as a result of our experimental work whether it would be of sufficient value for clinical use."

I have used amniotic fluid in an endeavor to prevent adhesions, but I am not convinced that it has any value.

In a paper read before the St. Louis County Medical Society in 1913 on "Intra-abdominal Complications Following Laparotomies,"³ I called attention to the fact that intra-abdominal tension was responsible for spreading infection and promoting adhesions.

It has been my experience that cases in which there has been a great deal of distention of the abdomen with vomiting following a laparotomy and where it has been difficult to get a bowel action that the patients seemed to develop symptoms later of adhesions. Great intra-abdominal pressure must force the intestines and omentum firmly against the peritoneal incision or other areas that may have been traumatised at operation. This firm pressure cannot but favor adhesions in these areas. If we can lessen this intra-abdominal distention in any way, I believe adhesions are less likely to occur.

Change of position, except in acute infection, even turning the patient onto the abdomen, makes it less likely for gasses and contents to be trapped in coils of intestines. The use of the rectal tube occasionally will relieve the accumulation of gas in the lower bowel above a firmly contracted sphincter.

Intestinal stasis from kinks and obstruction causes reverse peristalsis and the contents coming into contact with a mucous membrane unaccustomed to these bacteria produces toxic effect. The patient is unable long to endure such a state. It is apparent therefore, that the fecal



Fig. 5 (left). Technic for burying knots in peritonization.
Fig. 6 (right). Proper method of peritoneal closure.

raw, denuded, and traumatised areas until nature has safely covered these spots with a healthy growth of cells. I am certain that, when used sparingly, simply spreading a thin film-like coat of sterile vaseline over extensive uncovered raw areas, it is of some benefit. It lessens the bleeding and exudate and has in no case in which I have used it done any harm, but on the contrary it has probably assisted the healing process underneath this film by keeping the contiguous loops apart.

Air has been forced into the abdominal cavity for the purpose of keeping affected tissues apart until normal peritonealization has taken place. Is it not likely that this will increase the intra-abdominal tension and the possibility of adhesions? An injured intestinal wall soon becomes thickened and edematous, and, the healthy portion being more easily compressed, the swollen areas would be forced into closer contact.

Experiments by Ochsner and Garside¹³ seem to prove that trypsin and papain lessen the number of adhesions materially.

The fact is mentioned in Keen's Surgery⁷ that antifibrin ferment is beneficial as it prevents the coagulation of the exuded serum.

Johnson,⁶ from a number of experiments, concluded that amniotic fluid is safe to use in the

current must be kept moving downward for the patient's welfare. The longer this state of affairs exists, the greater the disturbance, the slower the convalescence and the possibility of adhesions is increased. The extent and firmness of the adhesions may be in direct ratio to the virulence of the infection and the degree of the tension.

The most useful agency for removing gas and thereby preventing gastric dilatation is the nasal suction tube. It allows the intake of quantities of cooling fluids by mouth, which lowers the temperature, stops vomiting, carries off regurgitated poisonous substances within the bowel and promotes an early normal function of the gastro-intestinal tract.

When adhesions that are slowly obstructing the bowel are separated, the fecal current becomes more normal, imprisoned infectious contents are liberated and passed out of the obstructed loop to which adhesions may be fixed. These adhesions may not recur because the contents of the bowel are restored to normal and not infectious, which is the reason, no doubt, why we obtain cures in some of the cases.

In closing the abdominal wound the peritoneum should be turned outward and closed securely with plain catgut, no raw or traumatised areas being left within the abdomen (Fig. 6). The posterior sheath of the rectus should also be sutured with chromic catgut supplemented by stay sutures; the skin closed with subcuticular dermal, clips or plain sutures. An imperfect closure of the peritoneum and fascia invites hernia and adhesions. An insecure closure may result in the bowels wedging through the opening especially if a suture breaks. Peritonitis, obstruction and adhesions may result.

Tight suturing may cause necrosis, may produce an exudate, and can result in stitch abscess or wound infection. This infection of the abdominal wound may extend to the peritoneum; therefore, it should be drained early to prevent extension into the abdominal cavity.

Suture drainage or the use of a small Penrose drain is essential in case of oozing of a wound, to prevent the presence of a good culture medium for infection. All bleeding vessels should be tied to prevent unnecessary exudate in the wound area.

A change of position of the patient favors peristaltic action. The head and foot of the bed

should be elevated alternately and the patient turned from side to side occasionally in non-infected cases. The gravitation of pus in the prone position favors the early healing of the wound.

Distention of the bladder should not be allowed, especially in the presence of a cystitis, as infection seems to travel through the viscus, causing adhesions.

Following an operation water with some alkali added is best tolerated at first and may be given in large quantities early, when the nasal suction tube is used. Strained liquids may be given soon; then oily laxatives in small quantities to assist in restoring the peristaltic activity of the bowels.

CONCLUSIONS

1. The patient should be well fortified for a laparotomy by diet, exercise, and necessary medication.
2. The functions of all the organs and alimentary canal should approach normal: a colitis treated, and infectious foci eliminated.
3. The incision should be adequate and cause little injury to the nerve supply.
4. The abdominal wall should be thoroughly relaxed during the operation. The peritoneum should receive a minimum exposure to light, heat, and air. A rubber sheet is best used for packing as it does not irritate, conserves heat and moisture, and, unlike gauze, leaves no lint in the abdomen.
5. The endothelial cells should not come in contact with irritating chemicals nor powder on the gloves.
6. Retractors should be used with care, and sponging done gently.
7. All operative work should be as thorough as possible, consistent with safety, leaving no associated diseased or infected tissue nor uncovered injured areas to invite adhesions.
8. Abscesses should be completely walled off, emptied by suction, and adequately drained.
9. Solutions, fluids, oils, and enzymes are of doubtful preventative value and should not be depended upon.
10. The abdominal wall should be carefully and securely closed, with no undue suture tension, leaving no gaps or traumatised areas inside the peritoneal suture line.
11. Excessive intra-abdominal and wound suture tension is avoided, infection circum-

scribed, and fluids tolerated immediately by instituting the continuous nasal tube suction.

12. The change of position in clea cases and the cautious administration of food aid uninterrupted recovery and help prevent permanent adhesions.

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DISCUSSION

DR. A. A. ZIEROLD (Minneapolis): This should be an extremely fertile field for discussion. Perhaps no part of surgery excepting intestinal obstruction, or the question as to whether or not we should remove a chronic appendix, or whether or not to remove or drain a gallbladder, has been given so much attention as this question of adhesions.

I assume from what Dr. Benjamin has shown us that he has included in his remarks all the developmental peritoneal folds and attachments incident to the varia-

tions of normal position and attachment that may occur in all of the viscera. If one considers these as adhesions susceptible to surgical treatment then the field of surgery becomes at once unlimited. To attempt to explain such adhesions on pathological grounds is most difficult. I believe the most satisfactory theory is that of Sir Arbuthnot Lane, who stated that adhesive bands giving rise to the "Lanc kink" and other so-called adhesion deformities were due to "crystallization of lines of force." This absolutely precludes any further discussion of the matter on rational grounds. It is probable that he as well as many who follow him in this country, notably Coffey and others, have taken exception to the limits of normal variation in the attachment of the abdominal viscera. Abdominal surgery owes its progress to the formation of adhesions. If it were not for peritoneal adhesions we could not perform operations upon the intestinal tract. Undoubtedly many adhesions occur which are not fortuitous, but I believe that we can confine the term adhesion as symptom-producing to those adhesions which produce obstruction, either total or incomplete. Why these should occur, there is apparently no adequate explanation. It is probable that the process goes through a very definite cycle of inflammatory reaction. There is no question but that every abdominal operation is followed by intra-abdominal adhesions of one sort or another. Certainly they are not all extensive or symptom-producing. I believe that the comment of Dr. Charles Mayo relative to adhesions is still pertinent and sound, i.e., "Adhesions between movable viscera or movable parts of abdominal viscera are of little consequence, but adhesions between abdominal viscera and a fixed point are sources of danger."

DR. O. H. WANGENSTEEN (University): I fully share Dr. Zierold's attitude of mind concerning the surgery of adhesions. Apart from the few instances in which operation may be necessary for the relief of pain, when adhesions acquire attachment to the parietal peritoneum and exert traction upon it and consequently give rise to distress, the only operative indication for adhesions generally agreed upon by surgeons is intestinal obstruction.

The illustrations which Dr. Benjamin has shown us are reminiscent of the discussions frequently heard a decade or more ago when it was ardently debated whether the pericolonic membranes fixing the cecum should be divided and what should be done with the cecum in which peritoneal fusion was defective. In 1922 when the Western Surgical Association met in Minneapolis, Dr. Coffey, of Portland, read a paper on "The Significance of Right-sided Abdominal Pain," which dealt chiefly with these abnormal membranes and kinks about the cecum. Dr. Eisendrath pointed out that these abnormal folds were as frequent in the left colon as on the right side. The discussion which followed generated more heat than light.

In speaking of Mr. Arbuthnot Lane's surgical treatment of these bands, kinks and folds about the cecum, one of the surgeons at St. Mark's Hospital in London related to me some years ago a story told at the Royal Society of Medicine where the subject was under dis-

cussion. The speaker, my informant told me, said that he had "often seen Mr. Lane do these operations and it reminded him very much of a squirrel running up and down a tree. The consummate grace and beauty with which he did it aroused his admiration but why in hell he did it, he probably would never know."

The formation of intra-peritoneal adhesions is but a part of the normal process of repair and the problem is not so much one of prevention but rather an attempt at limiting this repair process during the healing stage to the injured endothelial membranes.

Of the large number of substances that have been recommended to prevent the formation of adhesions and have been given adequate clinical trial, very few have stood the test of time. There are essentially four types of agents that have been employed to obviate intraperitoneal adhesion formation: (1) the application of greasy or oily substances over the denuded peritoneal surfaces, such as liquid paraffin, vaseline or acacia. The testimony of experimental evidence would indicate that these remedies stimulate rather than prevent adhesion formation; (2) the administration of drugs such as eserine and pituitary extract to augment intestinal activity in the immediate postoperative period; (3) introduction of dilute solutions of tissue digestants such as pepsin or trypsin into the peritoneal cavity; (4) the use of fluids which are slowly absorbed from the peritoneal cavity. It is well known that in the ascitic variety of tuberculous peritonitis adhesions are rarely seen. Saline and sodium citrate solutions are absorbed too quickly to be of any value in floating the intestinal coils apart from one another during the healing period. Amniotic fluid has been used for this purpose with varying results by a number of investigators. Blood taken from the patient prior to operation and defibrinated may prove to be of some value in the prevention of inter-intestinal adhesions.

Adherence of the intestine to the anterior abdominal wall can be prevented by keeping the intestine separated from the anterior abdominal wall during the immediate postoperative period. Air may be introduced into the peritoneal cavity on completion of the operation, and, with the patient's buttocks elevated on a couple of pillows, the air will accumulate between the intestinal coils and the anterior abdominal wall, in the vicinity of the umbilicus. For a patient who had previously been operated upon thirty times for intestinal obstruction of an adhesive character during the five-year period immediately preceding, I did the thirty-first but my first operation about two years ago. A complete lysis of the small intestine was done and on completion of the operation 1,000 c.c. of air was put into the peritoneal cavity and the patient's buttocks were elevated as has been described. I have had no opportunity to ascertain whether she still has a free peritoneal space, but no more operations have been necessary. During the two-year interval I have seen her three times for mild attacks of abdominal pain. On none of these occasions has she appeared to have intestinal colic. Each time a film has been made of the abdomen and no gas has

been visualized in the small intestine. On each occasion, the pain has subsided after brief treatment with conservative measures. On her first return, the trouble seemed to be an acute salpingitis; no surgical interference has been necessary. I have done this procedure in a few other patients with universal adhesions of the intestine, who have had frequent attacks of acute obstruction. In all of the other cases, however, the results have not been as striking as in the instance related above.

The method I do believe is of value in the prevention of adhesions to the anterior abdominal wall. The difficulty of keeping the intestinal coils separated from one another, however, is readily apparent and is a measure of the difficulty in preventing inter-intestinal adhesion formation.

DR. BENJAMIN (closing): I am in perfect accord with what Dr. Zierold and Dr. Wangenstein have said. I did not show these pictures to mean that all these adhesions should be operated on. We know that adhesions are protective in nature and if it were not for adhesions which protect the peritoneal cavity we would get a general peritonitis and death of the individual in infected cases. It is only when we have severe pain or symptoms of obstruction that we operate.

But why do some have adhesions with obstruction and others not? I am trying to show there are some adhesions that could be prevented. If you watch some surgeons operate you can tell that they are going to get adhesions. It is not just one thing that you do, but I have enumerated many things that must be kept in mind and if you omit one or more of these you may get adhesions. I have operated upon a number of patients for adhesions and was surprised at the results where there were adhesions of loops on intestines. Why do they adhere to one another? The point I was trying to make was that a great many of these adhesions come from infection within the bowel. By liberating the loops the intestine empties itself, becomes active, and adhesions may not re-form. Preventing intra-abdominal tension after the operation and keeping the abdomen flat helps a great deal. If there is air in the stomach it presses the loops of the bowel together and adhesions are likely to form. If you can prevent that and get a fecal current flowing soon after operation you are not liable to get adhesions.

It is not necessary to have as many adhesions as we do today. We believe some of these membranes are natural, as investigators have found them in the newborn. The ascending colon may be in the wrong position from imperfect rotation. The congenital membranes perhaps cause no trouble for years, but when one gets obstruction, of course it is necessary to operate on them. The reason we get a cure is that we liberate the infection in the bowel. In nine cases out of ten of pronounced constipation there is some malposition of the intestine or some adhesions. If the patient is well otherwise, I have found no case but what had normal action after operation and stayed that way until adhesions re-formed.

SURGICAL TREATMENT OF CONGENITAL CLUB-FEET*

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ANY discussion of the operative treatment of congenital club-feet should be prefaced by a general outline of the proper conservative treatment to be used before considering any surgical procedure.

It does not come within the scope of this paper to discuss the etiology or pathology of the condition except where it bears directly upon indications for surgical procedures.

One is apt to feel, after reading a number of papers describing the conservative or manipulative treatment of this condition, that a good result is easily obtained if one persists long enough along conservative lines. So many factors have bearing on the ultimate outcome in each case that the picture is only too often an entirely different one than that so frequently painted.

It is not our purpose to enter into any argument relative to the advisability of conservative in preference to the surgical treatment as that point is conclusively settled in the minds of all orthopedic surgeons and is here reiterated. No case of congenital club-feet should be subjected to operative treatment until the maximum degree of correction has been obtained by conservative means. If treatment can be started when the child is a week or two old, surgical intervention will seldom be required. It is in the resistant, relapsed or neglected case that we are primarily interested.

One meets with an occasional early case which resists treatment of the best type begun at once and carried on through an adequate period of observation. The portion of the foot giving the most trouble is usually the talus and calcaneus. A contracted calf muscle or thickened and contracted posterior ankle-joint capsule keeps the calcaneus pulled proximally in the leg so that the heel is deficient or poorly formed. In addition, the calcaneus and talus are frequently held in a position of inversion on the tibia, which means that weight-bearing will come through the outer and inferior surface of the heel bone. The result

is a tendency for the entire foot to roll into inversion and adduction with each step. Painful callosities and bursæ develop as the child walks and becomes heavier.

The typical deformity of a congenital club-foot is one of (a) inversion of the entire foot so that the lateral surface becomes the inferior; (b) adduction of the front portion of the foot at the mid-tarsal region; and (c) equinus, which means that the heel is drawn proximally and the front of the foot points distally. In correction of these deformities, as has been pointed out in many articles, the adduction of the forefoot should be overcome first of all. After the long axis has been straightened, the inversion is overcome, bringing the foot directly under the tibia in a good weight-bearing position. When this has been accomplished the foot forms an excellent lever with the ankle joint as a fulcrum for the stretching of the components of the calf. Other typical deformities develop in untreated cases as weight-bearing is begun. These are chiefly the result of the weight of the body on the deformed feet although undoubtedly the pull of strong muscles has much to do with increasing the degree of deformity. Callosities and bursæ develop over weight-bearing points and are frequently painful, particularly as the child gets older. Internal torsion in the shaft of the tibia results in a pigeon-toe deformity apparent even after the club-foot is corrected. Knock-knee proves to be very troublesome in other cases.

As has been stated before, if treatment is begun when the infant is but a week old very encouraging results can be obtained from the gentlest manipulations, aided by retentive apparatus in the form of frequently changed plaster or adjustable metal splints. It has been disappointing, however, to find in occasional cases that the foot is apparently corrected very well but on closer examination the calcaneus proves to be held drawn up in the leg and rolled into varus by resistant contracture of the calf muscle. These are particularly disappointing deformities and are very resistant to all conservative treatment.

Cases which have been well corrected by con-

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servative means require careful observation over a period of several years to guard against the recurrence of deformity. Here again one is frequently disappointed by the way varus and

congenital club-foot. Fiske reports 200 consecutive cases in the Children's Hospital of Boston in which 95 per cent of good or fair results were obtained merely by manipulative procedures.



Fig. 1. Unilateral club-foot in a boy four and one-half years of age, inadequately treated by conservative means after reaching age of one year. Correction obtained by subcutaneous plantar fasciotomy and wrenching.

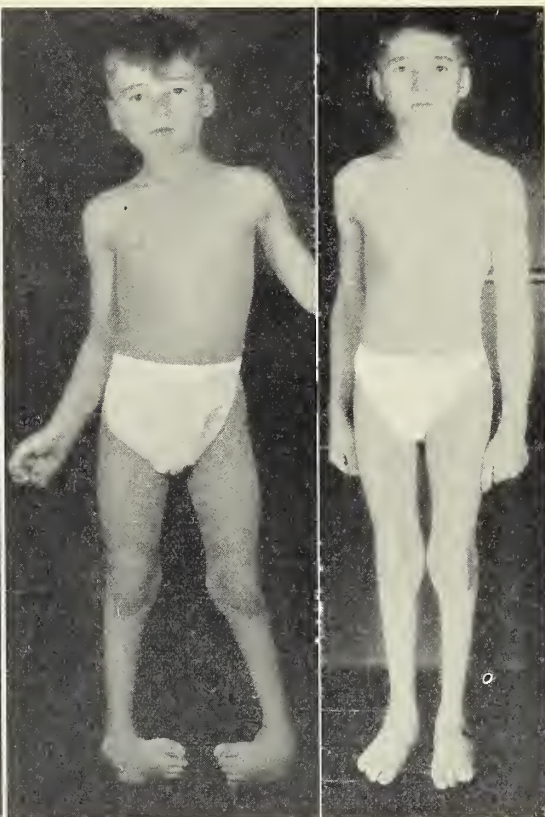


Fig. 2. Untreated bilateral club-foot in a boy eight years of age. Correction obtained by forcible manipulations, fasciotomy and, later, posterior capsulotomies and removal of wedges of bone from the tarsus.

equinus develop due to insufficient recovery of power in the peroneal muscles, too short a period of protection of the foot in splints, plaster or braces, or failure to correct the inward twisting of the shaft of the tibia. Many authors tell of the difficulties of treatment in these so-called relapsed cases and this has been borne out in our observations.

In addition to the early case which has never been completely corrected and the relapsed case we have neglected club-feet. Although there is no reason why any individual with a club-foot deformity should be neglected it is only too often in orthopedic clinics or hospitals that one hears about how the parents were told to wait until the child was a little older or that it would grow out of the deformity. We must continue to make a plea for early vigorous treatment in all cases of

It is not our purpose in this paper to consider conservative treatment as this part of the subject has been covered in voluminous writings. The surgical treatment has not been described to any great extent.

Treatment of Infants.—In infants there is very little need for cutting in order to obtain complete correction. It is not until the child is at least nine months old that it is to be considered. In our experience about all that is needed from operation is a lengthening of the heel cord by subcutaneous incision, by an open operation or, in addition to lengthening the heel cord, a division of the posterior capsule of the ankle joint, allowing the calcaneus to rotate distally into its normal position. As is often the case at operation the Achilles tendon is found adherent to its sheath as a result of the conservative

manipulations resulting in an impairment of function. The question arises as to why it would not be better to obtain a correction of the deformity by easy manipulation after a simple operation with sharp dissection rather than obtaining a gradual correction by much force and prolonged fixation which lead to formation of adhesions. In each case adhesions are formed but impairment of function is not a prominent feature. Following lengthening of the heel cord alone or with division of the posterior capsule, a plaster of Paris dressing is applied and left on for about six weeks, after the removal of which physiotherapy and further retention in metal splints are used. It is the aim in both conservative and surgical treatment to obtain correction of the deformity by putting the foot in abduction, eversion and dorsiflexion.

Treatment of Older Children and Relapsed Cases.—In older children who have had treatment but in whom the deformity has not been entirely corrected or has been allowed to relapse, the treatment must be more radical than that mentioned previously. The deformity in these cases may be a complete return to adduction, inversion, and plantar flexion of the foot, made worse because of the fibrosis which has occurred in joint capsules and in ligaments as a result of the previous conservative course of treatment. It may be adduction, inversion and equinus of the calcaneus so that the heel does not come to the ground in good weight-bearing position. It may be simply a pigeon-toe deformity due to an internal rotation in the shaft of the tibia although the foot is completely corrected. If allowed to persist as growth goes on the bones develop in the deformed position and as a result assume abnormal shapes, making complete correction by conservative means impossible. We have here, therefore, another reason for early and complete correction of the primary deformity, and in this part of the paper consideration of the deformities due to osseous changes will be left to the neglected or older cases. We have had occasion to do considerable work on the second type of deformity, namely the adduction inversion and equinus involving the heel, and more will be said of this later.

Before any cutting operation is done on these types of deformities the full degree of correction which can be obtained by more conservative means must be assured. Manipulation of the

foot under anesthesia with the assistance of the Thomas wrench or levers such as have been described by Hauser, Bettman, Telson and others in many cases yields a surprising amount of correction. It is only after a period of confinement in plaster of Paris, following a forcible manipulation, that one should consider radical treatment.

Surgical measures after removal of the plaster usually are confined to the soft parts. A contracted Achilles tendon may be lengthened by subcutaneous incision or by tenoplasty through an open incision, using any one of the many methods which are described. It must be remembered that with each lengthening of the tendon the muscle belly of the calf shortens and is made weaker. Too enthusiastic or repeated division of the contracted heel-cord frequently results in the calf muscle being represented by a small round mass just below the knee contracting weakly because of the shortened excursion of its fibers. Carefully chosen cases, however, are benefited by the correction of the equinus deformity.

Even with the lengthening of a tight Achilles tendon it is often impossible to get the heel down in good weight-bearing position because of contracture of the posterior and medial portion of the talo-tibial and talo-calcaneal capsules. Through an incision it is possible to expose these contracted structures so that they can be readily divided. It is surprising to find that many times they are thickened as a result of contracture to about three-sixteenths of an inch. Following disappointing results from posterior capsulotomy alone, it was decided to extend the scope of operation to include the medial capsules. The operation was suggested by those of Ober and Elmslie but is much less radical and therefore less objectionable.

The technic may be briefly outlined as follows: A curved incision is made down to the deep fascia on the inner side of the ankle passing just below the medial malleolus, extending anteriorly to about the region of the navicular bone. It is also carried proximally along the medial side of the Achilles tendon to a point above the ankle joint. The heel cord is exposed and lengthened by one of the numerous methods. The plantaris tendon is usually found to be tight and this is cut. On dividing the deltoid ligament just below the medial malleolus the posterior tibial tendon

is exposed and just under this is the long flexor tendon of the toes. When these are found to be contracted they are lengthened or divided in their sheaths. The medial capsules of the talo-tibial, talo-calcaneal and talo-navicular joints, are exposed when the tendons, vessels and nerves below the medial malleolus are lifted on a retractor and may be readily divided under direct vision. The dissection is carried back to include the posterior capsules. An easy manipulation is sufficient to put the foot in a position of over-correction and the wound can be closed in layers. A plaster of Paris dressing is applied from the tips of the toes to the middle of the thigh holding the knee straight and the foot in extreme abduction, eversion and dorsiflexion. The circulation of the extremity must be watched carefully because of the marked degree of sudden correction which is obtained. This plaster remains on, usually without dressing of the wound, for approximately six weeks, after which time it is removed so that physiotherapy may be instituted. Further stretching of the foot into overcorrection, baking, massage, and training of the evertor muscles give a good result. The corrected foot should not be allowed to go without the support of modified shoes for weight-bearing and a proper splint for use at night. It is only after prolonged observation that one can be sure that the deformity is finally cured.

In addition to contractures of the Achilles tendon and joint capsules, a tightness develops occasionally in the plantar fascia resulting in a hollow foot deformity. This is usually associated with equinus and sometimes varus and should be corrected before the heel-cord is lengthened. Simple subcutaneous division of the plantar fascia with a tenotome may suffice or it may be necessary to strip off all of the soft parts from the antero-inferior surface of the calcaneus to relieve the deformity (Steindler). In either case a plaster is applied for a month before further corrective work is done.

Transplantation of the peroneal tendons from their normal position under the lateral malleolus to a point anterior to it has been described and by straightening the line of pull of these muscles increased power is supposed to be applied directly to the outer side of the foot. The slack in the transplanted tendons is taken up by the muscles which now, by virtue of their straightened line of pull, have increased power as a corrective

factor. The results in our hands have not been satisfactory.

The only bony deformity considered under this heading is an internal torsion in the shaft of the tibia causing the child to toe in. The gait is



Fig. 3. This illustration shows a common residual deformity following conservative treatment over an extensive period. The inversion of the foot and particularly that of the heel is particularly noticeable.

awkward as a result and weight-bearing in this position favors recurrence of varus of the foot. A transverse osteotomy of the tibial shaft makes it possible to correct the deformity by externally rotating the distal fragment.

Treatment of Neglected and Adult Cases.—These two classes of individuals should be sympathized with on two accounts. Firstly, because they have been allowed to grow to adult life with an easily correctable deformity due to ignorance or neglect on the part of their parents or advisors, and secondly, because their deformities

are largely osseous and, although correctable, function cannot be completely restored.

Awkwardness of gait, knock-knees, back and leg aches due to faulty body mechanics, limita-



Fig. 4. The abduction and eversion of the foot and heel has been obtained by a postero-medial capsulotomy by the method described.

tion of activities to the point of complete seclusion in addition to suffering from the painful callosities and trophic ulcers which form on the weight-bearing surfaces are the experience of the adult club-footed cripple.

Much can be done to improve both appearance and function of the deformed feet by surgical means. Before any treatment is undertaken it is highly essential that a radiographic examination be made. The true nature of the deformity can be appreciated when the osseous changes are visualized.

Before any radical procedures are undertaken a maximum degree of correction of the deformity due to soft part contracture should be obtained by forcible manipulation of the feet under anesthesia with the assistance of a Thomas wrench or other suitable lever. Our preference is for the Thomas wrench as it has been very satisfactory in our hands. In addition to wrenching, the contracted plantar fascia and Achilles tendon may be cut. After this more conservative treatment a plaster of Paris dressing is applied holding the foot in the corrected position for a month or six weeks. Further relaxation may take place in the plaster so that the residual deformity is minimized. In the adult the pre-

liminary manipulation and tenotomy can usually be dispensed with.

Complete correction may be obtained by cuneiform osteotomies of the tarsus. The adduction of the front of the foot is corrected by a vertical wedge removed from the outer border in the region of the calcaneo-cuboid and talo-navicular joints, the base being directed laterally. The inversion and to some extent the equinus of the entire foot are corrected by a similar wedge in a horizontal plane. Sufficient bone must be removed to correct or even overcorrect the deformity. After five or six weeks in plaster, bony union is obtained, the malposition of the foot is corrected, and further treatment is unnecessary. Although the flexibility of the tarsus has been destroyed to a large extent, the function and appearance of the deformed foot have been markedly improved.

In the most severe cases and particularly in adults with a unilateral club-foot, the question of amputation of the deformed extremity should be seriously considered. The relief from pain, improvement in appearance, the steadying of the gait and increased ease in walking, and the removal of the consciousness of deformity fully repay the individual for the loss of his extremity. It is, of course, only to be considered as a last resort in the treatment of the deformity.

A brief résumé of three cases will illustrate some of the points which have been mentioned.

Case 1.—A boy four and one-half years of age reported at the Shriners' Hospital in January, 1933. He had a club-foot deformity of a moderately severe degree involving the left foot. Inversion of the entire foot plus plantar flexion and adduction of the forefoot was very apparent (Fig. 1). His treatment had not been started until he was one year of age and then consisted merely of a brace and modified shoe. A very slight degree of correction had been obtained before his admission. Under a general anesthetic his deformity was entirely cured by a subcutaneous division of the plantar fascia and flexor tendons of the toes, forcible wrenching of the foot, followed by the application of a plaster of Paris dressing for six weeks. He was discharged cured of his deformity, wearing a modified shoe for weight-bearing and a splint for use at night. He will be kept under careful observation for a period of two or three years to guard against any recurrence of his deformity.

Case 2.—This patient is a boy of eight years who has a bilateral congenital club-foot deformity of a very severe degree. He had not had treatment of any kind and shows very well the typical picture of neglect. At the time of his admission to the hospital in 1928 he was suffering from pain in both feet, instability of gait

and to a large extent was prevented from living the active life of a child of his age on account of the disability caused by his deformity. A marked inversion, internal rotation and adduction of both feet was very apparent. A large bursa or secondary heel was present on the lateral side of each foot in the region of the

all manipulation and it was decided to do a postero-medial capsulotomy of the type referred to in the body of the paper. This was done and the correction obtained was very satisfactory. Particular attention is drawn to the fact that the heel is now everted and the adduction of the foot is corrected (Fig. 4). Func-



Fig. 5. A simple splint consisting of sheet metal cuff and foot plate connected by a bar on the inner side of the leg is used to hold the corrected club-foot in good position while the patient is off his feet. This splint is bound on with an Ace bandage.



Fig. 6. The modification of the shoes which has been referred to consists of raising the outer edge of the heel and sole $\frac{1}{4}$ of an inch with a leather wedge and extending the outer side of the shoe laterally about $\frac{3}{16}$ of an inch with a metal reinforcement of steel or Monel.

metatarsal cuboid joints (Fig. 2). Following the principle of obtaining maximum correction by conservative means he underwent ten months of active treatment consisting of repeated manipulations under anesthesia followed in each case by a period of rest in plaster and later a subcutaneous division of the plantar fascia was performed, resulting in a fairly good correction of his deformity. At the time of his discharge from the hospital late in 1928 it was felt that he probably would have a recurrence and would need further surgical treatment. In June, 1930, he was readmitted to the hospital and at this time a posterior capsulotomy of the ankle joints was done, combined with the removal of wedges of bone from the outer side of the tarsus as described by Cook. Plaster dressings were applied and left on for six weeks and when these were removed a satisfactory correction had been obtained. Function of the ankle joint was apparently normal although there was limitation of motion in the feet, particularly in the region of the midtarsal joints. There has not been a recurrence of the deformity.

Case 3.—This patient is a girl of seven years who has had treatment since the time she was a baby, with, apparently, a fairly satisfactory correction of the club-foot deformity of the left foot. At the time of admission, however, there was a definite inversion and adduction of the foot, particularly noticeable in the region of the heel (Fig. 3). This was extremely resistant to

tion has become practically normal due to the very excellent recovery of power in the peroneal muscle group.

SUMMARY

1. Early gentle and persistent treatment in congenital club-feet yields good results in about 95 per cent of cases.
2. Surgical interference is only to be considered after conservative treatment over nine months to a year has failed to correct or cure the deformity.
3. Forcible manipulation under anesthesia is the first stage of radical treatment and is sufficient in many cases.
4. Tenotomy and capsulotomy are necessary in relapsed or neglected club-feet.
5. Removal of wedges of bone from the tarsus is the treatment followed in neglected and adult cases.
6. Postero-medial capsulotomy for the relief of uncorrected or relapsed inversion and equinus of the heel is described.
7. Night splints and modified shoes as referred to in the text are illustrated.

AMEBIASIS: REPORT OF CASE COMPLICATED BY LIVER, LUNG, AND BRAIN ABSCESS*

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IN PRESENTING this subject† it is desired to emphasize the fact that amebiasis is not only a tropical or subtropical disease, but may be found frequently in our own latitude. Further, carriers are much more common than cases with symptoms of dysentery.

In Minnesota, from 1917 to October 30, 1933, 545 cases of amebiasis with thirty-two deaths were reported. This includes 479 cases, mostly carriers, reported by the Veterans' Hospitals in exservice men. In addition, from 1926 to 1933, The Mayo Clinic reported 132 cases in persons from other states and foreign countries. The writer has histories in his possession of seven cases of amebiasis which occurred in Saint Paul during the past three years, in three of which there were liver abscesses, while the record shows that no cases have been reported to the health authorities from Saint Paul during this period.

Craig⁴ believes that about 10 per cent of the population in the United States are infected with *Endameba histolytica*. Williamson et al¹² reported the examination of 148 persons in Chicago in 1929, all food handlers, in whom he found twenty-seven carriers and two persons with symptoms attributable to amebic infection. Andrews and Paulson,¹ in 1930, examined 522 dispensary patients in Baltimore and found only 0.2 per cent infected. Kilpatrick⁸ has pointed out that infestation with *E. histolytica* causes dysentery symptoms in an amazingly small percentage of those infected. If we learn to look upon amebiasis as a chronic infection which may affect almost any organ of the body, similar to malaria or syphilis, we shall be better able to diagnose this disease more frequently.

The active, or vegetative, form of the organism dies very rapidly after leaving the body, and is non-infectious, but the encysted parasite may survive for weeks outside of the body at mod-

erately cool temperatures in the presence of moisture. This affords opportunity for spread of infection through water and milk supplies. Infected food handlers with unclean habits may readily pass on the infection to the consumer and constitute as great a menace as a typhoid carrier.

The incubation period varies from several days to several months. The symptoms vary so widely that they may be discussed under three heads as follows:

1. *Carrier or Latent Type*.—There may be no symptoms or the symptoms may be so protean in character that it may be impossible to at once determine whether or not the symptoms are due to the infection. An infected person may complain merely of lassitude, of tiring easily, or continuous headache, or he may present a neuropsychiatric condition. Others may have indefinite abdominal discomfort, slight intestinal disturbance with mild diarrhea and at times constipation. Such vague symptoms may continue for months. Without diagnosis and treatment, liver abscess or other complications may arise.

2. *Acute Type*.—The onset is usually sudden, may begin with headache, nausea, vomiting, chills and dysentery with frequent evacuations (fifteen to thirty a day) mixed with blood and mucus, and colicky pains and tenesmus. In some cases the acute symptoms may develop in a carrier. Fever, though infrequent, may appear. Exhaustion, feeble heart action, cardiac failure and death may follow, or the condition may improve and the chronic form ensue.

3. *Chronic Type*.—The course of the disease may be more or less chronic with attacks of alternating constipation and diarrhea. The stools contain much mucus and sometimes blood. There may be some fever, abdominal pain and tenesmus. There is often progressive loss of weight. The patient may become anemic and possibly jaundiced, and the muscles flabby. Anorexia and flatulence are common. The abdominal wall may be retracted, rigid and tender. The course is variable, not self-limited, and may lead to an incorrect diagnosis of nonspecific ulcerative coli-

*Read before the Staff of Miller Hospital, Saint Paul, November 7, 1933, and also before the Ramsey County Medical Society, Saint Paul, December 6, 1933.

†Since preparing this paper numerous articles on this subject have appeared in recent numbers of the *Journal of the American Medical Association*, one of which has covered the subject of treatment. For this reason the discussion of treatment has been omitted.

tis, mucous colitis, appendicitis or malignancy. If the proper treatment is instituted, some patients will recover entirely and the amebæ in the stool will disappear within a short time. Occasionally the active forms and often the cystic forms persist after all symptoms have disappeared. Complete recovery is often doubtful, for, after an apparent cure, a relapse may occur. Repeated relapses may occur until some grave complication arises. Craig⁵ states that probably only one-third of treated cases recover entirely with continued absence of the organisms.

The ultimate diagnosis in amebiasis depends entirely upon the accuracy and persistence in examination of the feces for this protozoa, but first of all the physician must be alert to the possibility of this disease. One negative stool examination means no more than one negative sputum examination in a suspected case of tuberculosis. In acute, fulminating cases when a double infection, amebic and bacillary, is suspected, the subcutaneous injection of one-half grain emetin twice a day for a day or two may be given, followed by a saline cathartic. This may cause the patient to pass a stool mixed with blood and mucus in which the ameba may be found. A sigmoidoscopic examination may give valuable information.

Complications.—Hepatic abscess, single or multiple, is the most frequent complication and may occur at any time, often after all symptoms of dysentery have ceased and sometimes before any intestinal symptoms have developed. The amebæ reach the liver either through the portal vein or possibly by migration through the intestinal wall with direct invasion of the liver. In addition to amebæ, the abscesses often contain a variety of bacteria. In seventy-four cases reported by Craig,³ the incidence of liver abscess was 33 per cent; in ninety-five cases reported by Harris⁶ only 15 per cent. Of 639 cases of amebic liver abscess collected by Rouis,¹⁰ 70.8 per cent were in the right lobe. In 562 cases of liver abscess, Zancarlo¹³ found a single abscess in 60 per cent.

Rogers⁹ recognized a presuppurative stage of amebic hepatitis in which the amebæ lodge in the portal capillaries of the liver. Rapid, painful enlargement of the liver may occur. Rogers believes that the disease in this stage may often be cured by emetin and a liver abscess prevented. The differential diagnosis between the presuppurative and suppurative stage is difficult.

Liver abscess is easily overlooked, as it may develop insidiously and the liver may not be enlarged or tender. A perforation may be the first indication of its presence. Examination may

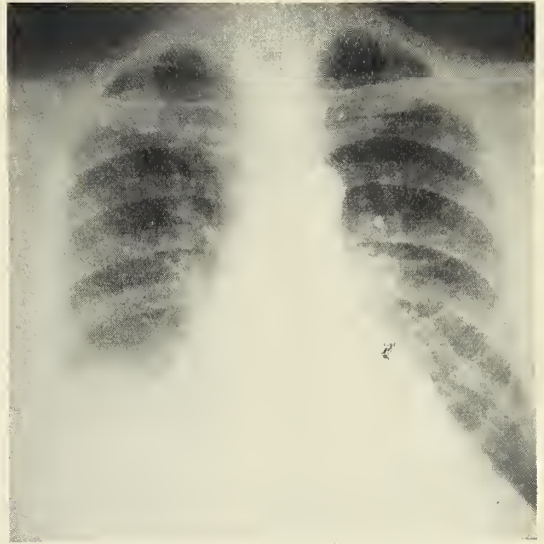


Fig. 1. Roentgenogram of the lung at the time of admission to hospital. Note a small area of pneumonia and pleurisy, right base.

show an enlarged liver and pain may be elicited on sudden pressure; crepitation at the right base of the lung with dry cough may suggest the condition. X-ray examination may show diminution of the movement in the right diaphragm or the diaphragm may be high and nearly motionless. The leukocyte count may be normal, but when the usual secondary infection is present there is a leukocytosis of from 12,000 to 40,000, with an increase in the polymorphonuclears.

The abscess may perforate spontaneously into the pleural cavity, lower lobe of the right lung, pericardium, or to peritoneal cavity.

Abscess of the lung may be due to direct extension from the liver by perforation through the diaphragm and pleura, or a primary abscess of the lung may occur independently of hepatic disease by the invasion of the ameba from the hepatic veins. Rogers⁹ reported lung abscess in 20 per cent of his liver abscess cases.

Brain abscess, according to Kartulis,⁷ occurred in 3 per cent of his liver abscess cases. It usually complicates either liver or lung abscess, although two cases are reported in which at autopsy there were no apparent lesions in either the liver or lung. Brain abscess is usually single, but may be multiple.

CASE REPORT

The patient‡ was a local fur dealer, forty-five years of age and married. His family history was unimportant.

In 1917 and each succeeding year he went to Europe, visiting France, England, Germany, Holland, and

ly distended and doughy in consistency. Neurological examination was negative.

On May 3 he had rigors lasting several hours. His temperature was then 102° F.; pulse 104; respiration 28. Dullness and bronchial breathing were present over the right lower lung area. He was admitted to

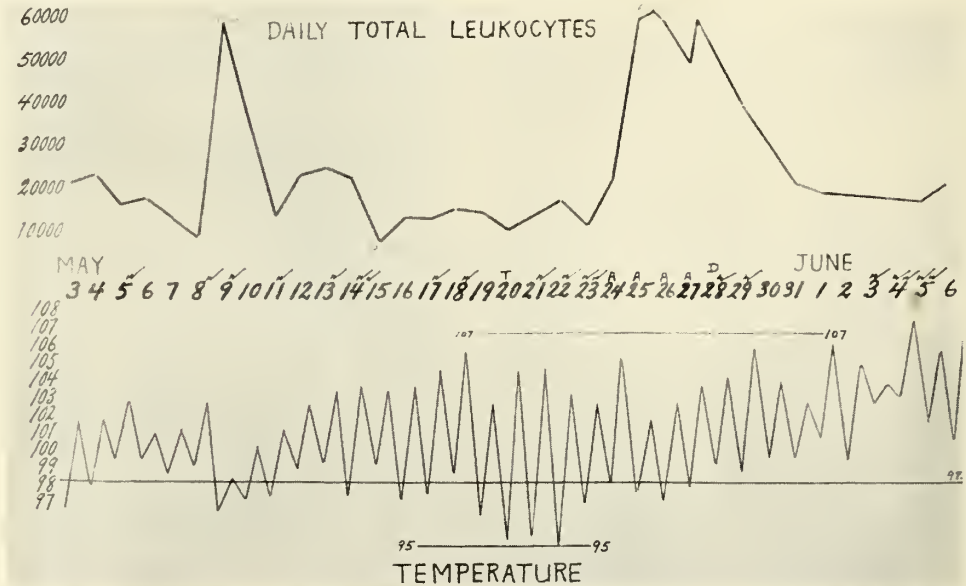


Fig. 2. Daily leukocyte and temperature curve. Chills occurred on dates checked. A, aspirations of chest. D, drainage of liver abscess.

Switzerland. He had had no illness until after his first European trip, when he developed frequent headaches, thought to be due to sinusitis and for which he consulted numerous rhinologists without relief. In July, 1932, he suffered from an attack of "influenza" and in the same month, while still not well, went to Europe. His headaches became more frequent and he became increasingly irritable. Friends thought the condition was due to business worries, but this he denied. Constipation and occasional indefinite abdominal pain were present, thought to be due to duodenal ulcer. In March, 1933, his headaches became more frequent and intense for which he frequently used 50 to 60 grains of aspirin daily without relief. About April 15, 1933, he became tired, listless and drowsy. This condition increased until April 25, when, while on a trip to Winnipeg, he suffered a slight chill with nausea and vomiting, and complained the next few days of feeling cold.

The patient was first seen on April 22, 1933, when he complained of intense headache and generalized aching. He did not appear sick, was well nourished and mentally alert. The skin had a yellowish tint while the sclera was bluish white. His temperature was 100° F. A few fine, crepitant râles were present at the base of the right lung, posteriorly. The abdomen was slight-

ly distended and doughy in consistency. Neurological examination was negative. X-rays of the nasal sinuses were negative. His hemoglobin was 63%; erythrocytes, 4,060,000; leukocytes, 23,360; p.m.n., 94%; lymphocytes, 5%; monocytes, 1%.

From May 3 to May 9 he suffered occasional chills and his temperature ranged from 100 to 103° F. During this period additional laboratory tests were made. Blood agglutination tests with *Bact. tularensis*, *B. abortus*, *B. typhosus* and *B. paratyphosus* and blood cultures were negative. The van den Bergh test showed: immediate reaction, trace; direct delayed, 3 plus; indirect, 2 plus. Blood smears examined for malarial parasites were negative. Blood chemistry findings were within normal limits. Blood streaked sputum, present in small amounts, showed staphylococci and streptococci only. The urine contained bilirubin. Three stool specimens were examined for amebæ and dysentery bacilli with negative results.

On May 9, the patient's temperature, pulse and respiration dropped to normal for twenty-four hours, to be followed by daily chills and elevation of temperature as shown in the accompanying chart (Fig. 2).

A chest x-ray, on May 10, showed small, pneumonic patches at the base of the right lung with exudative pleurisy; also a small pneumonic patch or infarct in the left upper lobe.

‡This patient had visited Chicago three or four times each year. Although he did not reside at a "loop" hotel, he may have taken meals there.

On May 17 the patient had his first liquid stool. Examination by Dr. K. Ikeda showed many actively motile *Endameba histolytica*. On this date the liver was not tender or palpable but the abdomen was definitely distended and x-ray of the liver and abdomen was negative. Emetin hydrochloride, $\frac{1}{2}$ grain by hypo twice daily, and also stovarsol, grains 4 by mouth three times daily, were begun.

May 18 the temperature was 106° F.; pulse 140; respiration 44. The chills were more severe and a slight cough appeared for the first time. Physical findings remained unchanged.

On May 20 an x-ray taken twenty-four hours after the intravenous administration of thorium dioxide (thorotrast) showed the liver and spleen enlarged but no evidence of a liver abscess. This examination was incomplete since twice the amount of thorotrast should have been given but such dosage was considered inadvisable because of the radioactivity of this drug. A blood transfusion was given.

During the following days there were several liquid stools, one bloody, all containing large numbers of amebæ. Chills and sweats increased in severity. The patient, previously alert, directing his business, now became confused and irrational at times. The urine showed traces of albumin, sugar and a few hyaline and granular casts; also bilirubin. Blood examination showed: sugar, 150 mg.; urea-nitrogen, 20.6 mg.; blood calcium, 9 mg.; blood chlorides, 1.41%.

At 1:00 a.m., May 24, the patient awakened with sharp, excruciating pain in the right chest. A few moments later he was in shock, the entire body cyanotic. He improved remarkably under administration of caffeine sodium benzoate, morphine, and oxygen. A single, flat x-ray plate, taken with a portable unit, indicated a diffuse capacity of the entire right lung with displacement of the heart and mediastinum to the left, obliterating entirely the outline of the heart and diaphragm on the right side. By thoracentesis 1,000 c.c. of dirty, yellowish, purulent fluid was removed. The fluid contained a trace of bile pigment, many pus cells, and an occasional Gram-positive coccus but, as might be expected, no amebæ. Chills and sweats continued with increasing weakness and fever. About 1,000 c.c. of yellow, purulent fluid were obtained daily by thoracentesis. Smears showed immotile ameba-like bodies, many pus cells, Gram-positive diplococci and diphtheroids.

On May 27, on inserting the needle in the tenth interspace in the posterior axillary line, 10 c.c. of thick, greenish, purulent material mixed with blood were obtained. The following day, under local anesthesia, portions of the ninth and 10th ribs were resected in the posterior axillary line and a drain inserted into a large, thick-walled, multilocular liver abscess (Drs. H. B. Zimmermann and E. M. Jones). The abscess contained dark, milky, purulent material of offensive odor. Microscopically there were liver cells, ameba-like bodies, branching mycelia, actively motile bacilli, short spirals and many Gram-positive and Gram-negative organisms, including long filaments and fusiform bacilli.

During the next six days the patient was comatose;

chills were frequent; there was transitory right-sided facial paralysis while the superficial and deep reflexes were present and equal. The abscess cavity was irrigated daily, large amounts of pus being removed. Death occurred June 7, 1933.

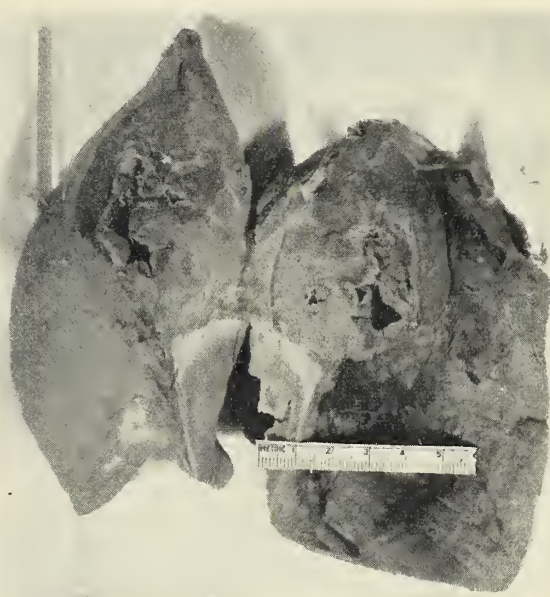


Fig. 3. Amebic abscess of the liver, surrounded by a zone of fibrosis—an opening into the pleura through the diaphragm, on the right.

AUTOPSY REPORT BY DR. K. IKEDA (ABSTRACT)

Chronic empyema, right pleural cavity, which communicates with the liver abscess through the diaphragm.

A partially collapsed right lung, 700 grams, covered with a thick, purulent exudate. A small abscess 2 cm. in diameter at the base, surrounded by a zone of chronic pneumonia, also an infarct 5x3 cm. above the abscess.

The left lung shows an area of well defined, fresh infarct in the midportion of the lower lobe.

The spleen, 300 grams, shows two, small, yellowish, lumpy areas 5 to 8 mm., representing embolic abscess.

The liver, 2,000 grams, contains an irregular abscess, 2 cm. in diameter, along the dome, which is adherent to the diaphragm. The cavity communicates with the pleural cavity and is lined with rough, yellowish green, velvet-like exudate. Around the main abscess are numerous, small, yellowish, cheesy areas of necrosis, from a few mm. to 1 cm. in diameter, all of which are surrounded by a zone of firm, grayish fibrosis.

The duodenum shows a large, irregular ulcer 13 or 14 mm. in diameter and 8 mm. in depth, with a sharp, overhanging edge, surrounded by a zone of deep, reddish, inflammatory reaction. The ulcer contains fresh blood clot.

In the jejunum are several small areas of yellowish mucosal nodules from 5 to 7 mm. in diameter containing a thick, cheesy material.

In the sigmoid are multiple diverticuli. One of them,

particularly, shows a definite inflammatory reaction around the opening and contains thick, glairy mucus and liquid feces. No other lesions are present in the colon.

latter presumably was present for several months. The blood picture was unusual, the leukocytosis being much higher than that reported in the literature.

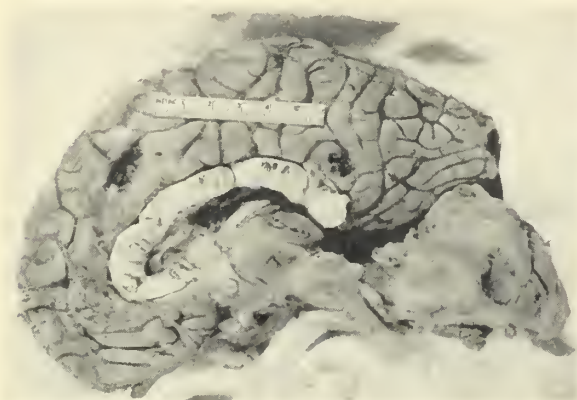


Fig. 4. Multiple amebic abscesses of the brain. Note a large abscess in the cerebellum, also a rupture into the lateral ventricle.

The brain shows many irregular abscesses, from a few mm. to 2 cm. in diameter, containing a thick, greenish, sticky pus, scattered throughout the substance of the brain, including the cerebellum. Many are found superficially along the cortical surface; others are deep in the white matter. One abscess ruptures into the left lateral ventricle.

Diagnoses: (1) Chronic amebic abscess of the liver with rupture into the right pleural cavity. (2) Multiple embolic amebic abscess of the brain. (3) Embolic amebic abscess of the right lung. (4) Embolic abscess of the spleen and jejunum (possibly amebic). (5) Acute duodenal ulcer, possibly embolic. (6) Infarcts of the lungs. (7) Multiple diverticuli of the sigmoid with a primary amebic diverticulitis. (8) Chronic empyema of the right pleural cavity.

DISCUSSION

With several consultants, called during the first half of May, the writer considered numerous diagnostic possibilities, including tularemia pneumonia, septic thrombosis of the deep abdominal veins with lung infarcts, malignant endocarditis and undulant fever. By the aid of the parasitologist the true nature of the disease was determined to be amebiasis. It is of special interest that this case presented no dysenteric symptoms until after abscess of the liver and lung developed and that constipation was more or less troublesome until late in the course of illness. Could the headaches which were so persistent over a period of fifteen years have been due to amebiasis? Such cases have been reported. It seems improbable that the brain abscess preceded the liver abscess, which

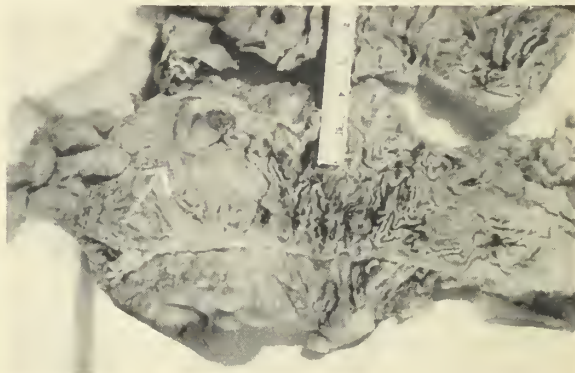


Fig. 5. Primary amebic diverticulitis in the sigmoid.

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TREATMENT OF ENURESIS*

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IN recent years we have learned to avoid treating symptoms as such. Rather, we have directed our efforts to the uncovering of factors responsible for the symptom, hoping thereby to insure a more permanent result. There is a danger, however, in treating enuresis symptomatically since by so doing we place in one group individuals who are suffering from a variety of conditions. Perhaps a discussion of the treatment will demonstrate this.

Preventive measures demand first consideration. Awakening the child two or three times, if necessary, each night during the second and third years to insure a dry bed will go a long way towards preventing later bed-wetting. The majority of enuretics have not received such training and pediatricians, as a rule, overlook emphasizing the need of such measures, early. The parents must understand the danger of the use of force during the period of training. Calmness and patience with as little display of anger as is possible are short cuts in this training process.

Control of the sphincter is a simple matter in most children. In some, however, despite normal intelligence (and it may be of interest to note that the average enuretic child rates well on intelligence tests) and a real effort on the part of the child to coöperate, training is not established. These failures can be attributed to such factors as differences in bladder and urethral irritability, the reception of impulses in the central nervous system, the ability of the kidneys to concentrate, the temperament of the child, and the temperament of the parents.

Let us assume we are dealing with a boy in whom attempts at training have been unsuccessful. He is ten years old and is sensitive because of his failure to be trained. He has been given many forms of treatment, none of which have resulted in permanent relief. He comes to the physician for treatment and appears to be anxious to coöperate. To begin with, he is given the opportunity to talk the whole matter over with

the physician who, through sympathy and understanding, attempts to gain his confidence. The parents are kept strictly out of these interviews and the boy understands early that they will no longer assume the responsibility for the treatment. He is told that he has indicated a wish to get well, that we accept him at his word and are prepared to help him. One cannot overestimate the value of the relationship that can be set up between an unhappy child and an understanding adult who remains undisturbed by failures to respond to treatment. Because of this relationship he may, for the first time, consistently cut down on fluids late in the day, refrain from too active play after dinner, and retire on time. He may make a strong effort to respond to the alarm clock and set it again for the next awakening. Success may follow these simple measures previously attempted without results. The boy is asked to come in once a week with a chart upon which he has indicated whether or not the bed has been dry at different periods during the night. In most instances any child who is coöperative can be assured a dry bed if he is awakened frequently enough during the night. It is often necessary to awaken him quite frequently at the risk of losing needed rest in order to assure him that he can have a dry bed several nights in succession. This gives to the child the encouragement that is necessary to continue with treatment. By degrees the number of awakenings can be lessened and the bed will, in all probability, remain dry.

Unfortunately, every child who professes a wish to get rid of his enuresis does not remain coöperative. This may be due to the fact that he has never learned to do things for himself, or that the symptom is too deeply rooted and he is less anxious to get well than he had imagined. Under such conditions the treatment must be referred back to the parents.

It may be well at this point to emphasize the inadvisability of continuing routine measures over a long period of time. Too often, a child is placed on restricted foods, fluids or exercise, or given a medication long after its inefficacy has

*From the Amherst H. Wilder Child Guidance Clinic. Read before the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 22, 1933.

been demonstrated. Atropine, for example, useful in some cases has little value in others, and this should be quickly determined.

The child is told early that the symptom is a stubborn one and that many changes may be necessary before the final treatment will be found. His weekly reports will be honest if he is certain that the physician respects him for his effort.

Day and night urines are routinely examined to rule out infection and to determine his ability to concentrate at night. Fluids are increasingly limited. He is given exercises towards strengthening the sphincter muscle. Recently, we have been using the salty diet recommended by Krasnagorski, which aims to retain fluids in the tissues. We are as yet unable to decide on the effectiveness of this treatment.

If treatment directed towards physical factors is unsuccessful we search for those of an emotional nature. It is unnecessary to explain to anyone who has tried to treat enuresis that emotional factors play an unusually important role. The plan of treatment now changes. Frequently the restrictions above referred to are removed. The awakening at night by the use of the alarm clock, however, is usually continued.

The interviews are directed primarily towards the building up of a feeling of confidence. He is allowed to speak of his parents, his brothers and sisters, teachers, classmates. As he becomes more confiding he has the courage to tell of his jealousies, hatreds and fears. He dislikes, particularly, to tell of his fears. He hates to be consid-

ered a coward and yet most enuretics are weighted down by fears and worries. Later on in the interviews when he is no longer ill at ease the subject of sex must be discussed. His anxieties in connection with masturbation and other sexual irregularities must be talked through. He learns that he is no different than a great many others and that there is little danger of insanity or severe illness resulting from masturbation. Through his getting rid of guilty feelings in connection with his practices and fantasies, he is more apt to lose the insecurity that has helped to keep him from getting well. One needn't be a psychiatrist to carry on this treatment. As a matter of fact, the family physician or pediatrician may have the advantage over the psychiatrist through the fact that he is already known and respected by the family.

We must keep in mind that we are dealing with a child who has suffered. If our efforts to help him meet with failure we can let him go with the feeling that he will probably soon outgrow the habit and be like other boys. He should never feel that we are disappointed in him, so that he can still accept himself as an individual of merit.

We have learned a great deal from those who have worked intensively with problem children. It is to be hoped that the work that is at present being done by psychiatrists and psychoanalysts on the problem of enuresis will give us a clearer insight into the emotional conflicts underlying the enuresis. We are very much in need of this insight.

SARCOMA OF SECOND METACARPAL BONE: CASE REPORT AND REVIEW*

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OUR knowledge of bone sarcoma has greatly increased in the last few years. On the other hand, any thorough review will emphasize the fact that there is still considerable confusion on the subject. This confusion is apparent in a study of the etiology, pathology or, for

that matter, almost any phase of osteosarcoma. For this reason and in conformity with the literature on the subject I am not hazarding a positive diagnosis but confining myself to an opinion based on a clinical, radiological, and pathological study of this case.

In November, 1929, H. C., a male, twenty-eight years old, a steel worker by trade, received a crushing blow on the back of his right hand. He stated that at the

*From the Arrowhead Clinic, Duluth, Minnesota. Presented at the April, 1933, meeting of the St. Luke's Hospital Staff, Duluth.

time he was aiding in removing a large bolt, with a chisel and sledge hammer. The hammer missed its mark, striking the hand above the knuckle of the right index finger. The back of the hand swelled, became discolored and painful.

The man worked in spite of moderate pain for three

measures from the tip of the third finger to the proximal extremity of the specimen, 17.2 cm. in length. It measures 6.5 cm. in width and up to 7.4 cm. in thickness in the region corresponding to the distal half of the metacarpal bone where the hand is extremely thickened. The skin of the palmar surface of the speci-



Fig. 1. Radiograph of hand taken in October, 1931.



Fig. 2. Specimen removed for analysis.



Fig. 3. Back of hand after removal of specimen.

months and the swelling increased. A pimple formed and later discharged a watery fluid. He consulted a physician who diagnosed the condition osteomyelitis and advised draining the bone.

On March 3, 1930, the bone was curetted. No pus was found and the attending surgeon stated that the bone did not have the gross appearance of osteomyelitis. Repacking and further treatment continued for months, the wound failing to heal and the swelling of the hand increasing. Red tissue filled the center of the rapidly growing ulcer.

This patient came under our observation in October, 1931. A radiograph of the hand (Fig. 1), taken at this time, revealed a swelling of soft tissue and bone destruction. Dr. Gage Clement, radiologist, was called to examine the hand and advised the use of preoperative x-ray therapy because of the probability of malignancy. A specimen (Fig. 2) was removed for analysis. The second and third metacarpals and corresponding fingers were almost sloughed off so that removal was easy. There was a fracture of the second metacarpal. A view of the back of the hand, after removal of specimen, is also of interest (Fig. 3). Dr. Berdez, pathologist, reported spindle cell sarcoma and his report of this specimen is as follows:

"Gross.—This is a specimen weighing 255 gms. The specimen includes the index, the third finger of the right hand, together with the corresponding metacarpal bones. The soft parts of the anterior and posterior surfaces of the hand corresponding to the bones removed are included in the specimen. The specimen

men shows an irregularly ulcerated area, measuring 2.2 cm. in diameter. In the center of the area there is an opening of a fistulous tract which leads toward the middle part of the second metacarpal bone. On the radial side of the specimen, the skin shows a large area of ulceration measuring 4x4.5 cm. The edges of the ulcerated area are quite irregular and lined with skin which is quite ulcerated in places. There is apparently little tendency toward healing. In this ulcerated area there are two other irregular openings leading also toward the second metacarpal bone. The walls of the fistulous tracts are lined by some edematous tissue of granulation. On cut surface the mass which is protruding on the palmar surface of the hand is formed by a whitish, compact tumor tissue showing in places a few small, cloudy, yellowish specks. The tumor involves also the second metacarpal bone *which is fractured just beyond its middle*. The tumor apparently also extends to the third metacarpal bone. The musculature of the palmar surface of the hand is infiltrated by the tumor masses. The interosseous muscles between the second and third metacarpal bones are also infiltrated.

"Microscopic.—The tumor tissue is formed by numerous, mostly spindle shaped, cells which are sometimes arranged in bundles. The tumor cells (Fig. 4 to 10, inclusive) show oval or round vesicular nuclei. A moderate number of mitoses are present. In places the tumor tissue shows fibrillar elements, at other places the tumor tissue shows small areas of necrosis. At the

periphery, the tumor tissue shows a tendency to infiltrate the surrounding tissues.

"*Diagnosis.*—Sarcoma of the hand."

The specimen was sent to Dr. Bell of the Univer-

before operation, showed an area in the lung which we considered metastatic invasion. Dr. Clements' report on the latter was as follows:

"The right lung shows a small spherical area of in-

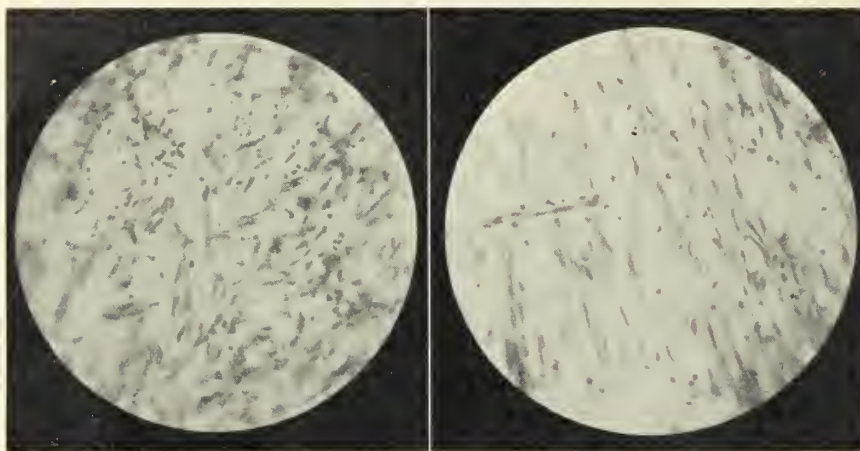


Fig. 4 (*left*). Proliferating fibroblasts which show no definite arrangement.
Fig. 5 (*right*). Fibroblasts show beginning parallelism. One capillary seen apparently as yet without lumen.

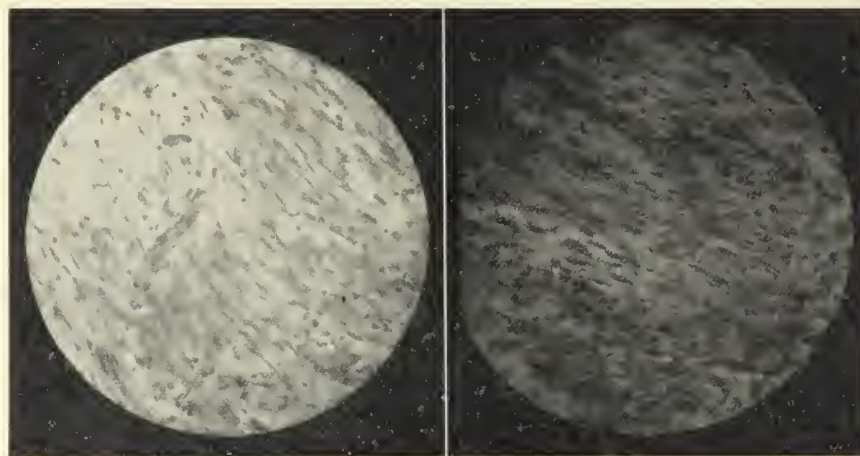


Fig. 6 (*left*). Zone of transition from the fibroblasts to the tumor tissue. The lighter half of the picture is formed by fibroblasts; the darker and more cellular part is tumor tissue: the tumor tissue is infiltrated with a few lymphocytic cells. A better capillary is also present. The tumor tissue consists here of cells resulting from proliferation of connective tissue cells.
Fig. 7 (*right*). Here the tumor cells are more densely grouped into intertwining bundles.

sity of Minnesota for corroboration. His report was:

"The tumor from the hand of H. C., sent to me by Dr. Berdez, shows a sarcoma. The histologic type is largely spindle cell. I do not see any bony tissue in the substance of the tumor but it may have arisen from the bones of the metacarpus. The prognosis is very bad but an occasional case survives. There is no treatment but amputation."

Amputation below the head of the humerus with complete dissection and excision of lymphatics of the axilla was performed and the patient made an uneventful operative recovery (Fig. 11).

A radiograph taken on February 5, 1932 (Fig. 12),

creased density, 2 cm. in diameter, just outside and below the hilum in the parenchyma of the lung which is, undoubtedly, a metastatic new growth. The left hilum is also exaggerated and there is some interstitial fibrosis over both lung fields."

A recent radiograph (Fig. 13), taken April 25, 1933, shows recession of the involved area and no new areas have been visualized. The patient has not coughed and has retained his normal weight. He has received the usual postoperative roentgen therapy with apparent beneficial effect.

This case is of interest because it illustrates

many of the problems arising in a study of osteosarcoma. The rarity of the tumor in this location, the association of trauma with subsequent tumor development, the neglect of tissue exami-

such history in 40 per cent in a series of 300 cases, Gross⁹ in 50 per cent, Meyerdig¹⁴ in over 50 per cent, so that one can safely assume that from 40 to 60 per cent present histories of trau-

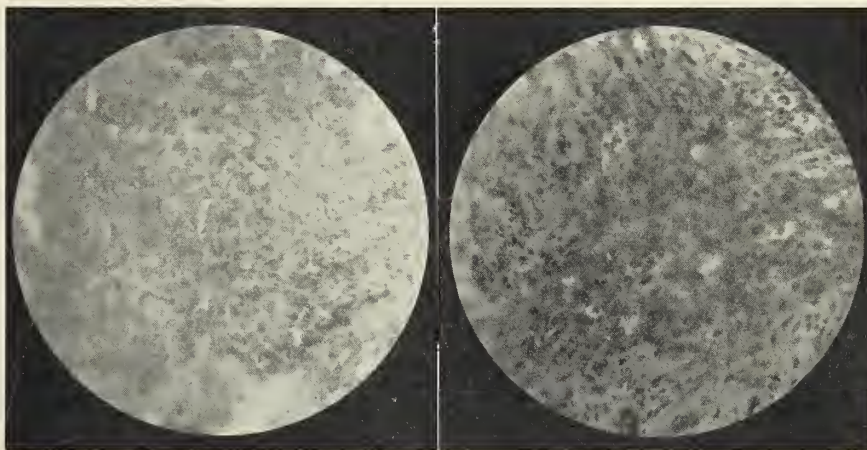


Fig. 8 (*left*). A small area of tumor tissue in which the tumor cells, instead of being spindle shaped, show a tendency to become polyhedral or round.

Fig. 9 (*right*). A similar area where the tumor cells show the same tendency to a more marked degree.

nation at first operation, the uncertainty of the origin of the tumor and the question of amputation in the presence of pulmonary metastases, warrant further consideration.

"The incidence of primary malignant bone tumors is best seen from the fact that about one case out of three of sarcoma of the human body is a 'bone sarcoma' (Kolodny¹¹). These tumors arise from cells which are supposed to form the most firm and stable tissues and yet osteogenic sarcomas rank with the most malignant new growths.

The femur, tibia and humerus are most frequently involved. This being a metacarpal sarcoma, it is interesting to know that metatarsal and metacarpal sarcomas are extremely rare (Coley⁴). Ewing⁷ quotes Christiansen's table showing that sarcoma of the bones of the hand occur in less than 2 per cent of cases.

It is significant that "osteogenic and giant cell tumors occur mainly at the ends of the long bones where the growth period is longest, the natural momentum of growth greatest and exposure to trauma most likely" (Ewing⁷). The ends of the diaphysis are most often the seat of osteogenic tumors; the epiphysis, of giant cell tumors, and the shaft of myelomas.

The association of trauma cannot be denied in many cases. Statistics vary. Coley⁴ found

ma. I think almost everyone will agree that it is not difficult to elicit a history of injury in almost all cases settled under compensation laws during the present depression. Local injury to cells must follow trauma and it is quite possible that atypical division and growth can develop. Necrosis, hemorrhage, aberrant growth in the granulation tissue may be disturbing factors.

Certain rules have been formulated in determining whether a given trauma is an exciting factor in etiology. Haas¹⁰ enumerated four as follows:

1. Definite proof of sufficient trauma at site of tumor.
2. No prior gross lesion or other injury or disease in same region.
3. Sufficient time elapsed from time of injury to allow for development of tumor.
4. Definite signs of tissue disturbances should persist from the time of injury to the time of development of the tumor.

R. Baumann-Wattwil¹ believes that there is a definite relation between trauma and subsequent tumor development. He enumerates four rules for consideration:

1. Given accident must be single.
2. Lesion produced must be considerable.
3. There must be some relation between site of accident and tumor.

4. Time relation between occurrence of trauma and appearance of tumor must be reasonable, namely, 3 weeks to 2 years.

A most important and obvious conclusion re-

Kolodny's¹¹ classification of bone sarcoma is as follows:

1. Osteogenic sarcoma.
2. Ewing's sarcoma.

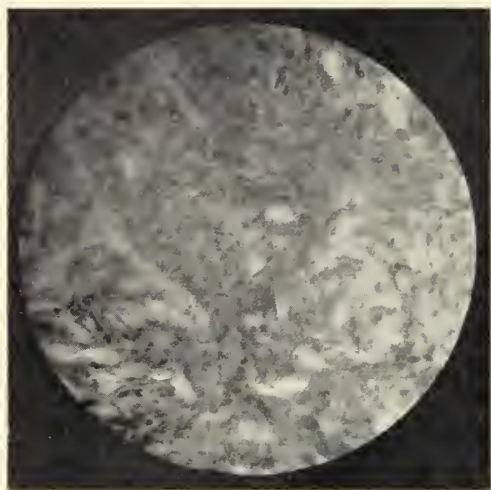


Fig. 10. An area of tumor tissue at the edge of which there is a marked tendency for the fibrillar elements to become hyaline. The tumor cells between the hyaline elements are small, atrophic.

garding the relation of injury to tumor formation is stated by Hass,¹⁰ namely: "All of the traumatic explanations fail without assuming a previous abnormality, because most injuries are not followed by sarcoma."

One cannot pass the subject of trauma without stressing the necessity for removal of tissue in all cases demanding operation. The tissue removed may not contain the malignant involvement, but the effort is worthwhile. Formerly, dissemination was feared, but this probably occurs only in exceptional cases. It is well to study all cases of fracture, especially the ones that follow rather insignificant traumata. A pathological fracture following primary union of a fracture after open reduction is illustrated in Lewis' *Practice of Surgery* (pp. 29, 30). The original specimen removed was reported as consisting of granulation tissue. Following operation a large sarcoma developed. A subsequent study of the original specimen showed the presence of sarcoma at the time of open reduction. This illustrates the value of removing tissue in bone operations for microscopic examination in cases of doubtful etiology. This case would have been recorded as sarcoma following fracture if the original specimen had not been saved and thus shows the difficulty of histologic diagnosis.



Fig. 11. Patient following operation. Uneventful recovery.

3. Myeloma.
4. Unclassified sarcomas, including the extra-periosteal sarcoma and the angio-endothelioma.
5. Giant-cell tumour (benign).

Copeland⁶ divides all osteosarcomas into two large groups, namely: (a) those related to osteogenesis; (b) those of non-osseous origin.

Inasmuch as the tumor in the case reported probably originated from bone, we shall consider here only the first group. Osteogenic sarcoma is a comparatively recent name given to those tumors derived from mature bone cells or from cells retaining a potential ability to form bone. It does *not* mean, necessarily, that the tumor thus formed must contain bone, production of bone being merely one of the properties of the cells.

The relationship between bone development and tumor formation is not generally appreciated. It is commonly assumed that a permanent completely developed skeletal structure is achieved early in adult life. Copeland⁶ states that the "development of the human skeleton is never complete and that at all ages there are transitional forms persisting between component parts of bone."

Osteogenic sarcomas are of mesoblastic origin and as such may exhibit any of the characteristics of cells from the primary undifferentiated

spindle cell to the mature differentiated osteoblast. Osteogenic sarcomas originate from the osteoblast at some stage of its development: fibroblast; chondroblast; osteoblast.

Early and persistent pain at the end of one of the long bones is one of the first symptoms (Coley⁵ and Ryerson¹⁵). Benign tumors rarely cause pain. Osteomyelitis usually causes fever and



Fig. 12. Radiograph taken February 5, 1932, before operation. Note area considered metastatic invasion.

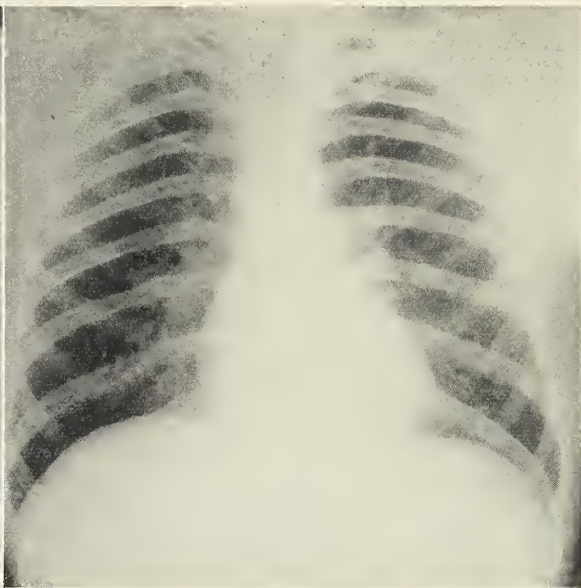


Fig. 13. Radiograph taken April 25, 1933, showing recession of involved area.

The diagnosis of bone sarcoma thus becomes doubtful in the primary stage. Given a spindle cell sarcoma one cannot definitely state that it is a fixed fibroblast—capable of no further development than fibrous tissue or that it is osteogenic, undifferentiated and potentially able to develop into the fixed osteoblast and develop bone.

It is, therefore, obvious that a pathological diagnosis alone may be insufficient in determining whether the origin of a sarcoma is from bone or surrounding connective tissue. A section of the bone itself would be valuable. Desjardins states that, in many quarters, the diagnosis of the pathologist is accepted too blindly and often clinical, radiologic, and other factors are not given due consideration. The opposite is often true and some of Coley's work discredited because of omission of pathologic proof. The diagnosis must rest on all three angles and even then, sometimes, definite statements cannot be made. Regressive changes occur after radiation and inflammatory changes sometimes confuse the picture. The difficulty in differentiating some highly cellular granulation tissue from sarcoma is well known.

leucocytosis. Palpation may aggravate the pain. Pathological fracture may occur when the tumor develops sufficiently, as it did in this case. General dissemination occurs in almost every case within the first three years. It was formerly thought that the blood stream was the only means of transmission. It is now known that the lymphatic system occasionally transports the tumor cells. Pulmonary metastases are most frequent. Articular cartilage is very resistant to tumor invasion so that joint invasion is rare.

Treatment may be classified as follows:

1. Surgery
 - (a) local excision
 - (b) amputation
2. Roentgen and Radium Therapy
 - (a) preoperative
 - (b) postoperative
 - (c) palliative
3. Coley's Serum

As in most malignancies these cases are usually seen too late for proper treatment to be given. Usually a combination of the treatments mentioned is used. Preoperative and postoperative radiation to the operative field and any metastases may be given. Magnusson¹² advises against

the use of radiotherapy alone, while Coley⁵ advises early amputation in osteogenic sarcoma followed by toxin treatment. This method, in comparison with preliminary radiation and subsequent amputation, produced better results. Prolongation of life in irradiated cases is usually noted and pain is often relieved. Whether amputation should be done in the presence of metastases is doubtful. Gibbon⁸ reports a case of a five-year cure following amputation with metastases present, the latter being treated by x-ray. Behring³ believes that biopsy aggravates the condition, but whether performed by punch method or open method, Coley⁵ believes the advantages far outweigh the disadvantages.

The proper use of Coley's serum demands considerable study. It is a combination of the toxins of streptococci and bacillus prodigiosus and its use based upon the fact that patients having had erysipelas rarely develop malignancy and that if the disease develops during malignancy, regression occasionally has been noted. It is often used in combination with radium by Coley⁵.

The prognosis in osteogenic sarcoma is poor in the majority of cases. Most of the patients do not show the marked cachexia noted in carcinoma. In 200 cases of osteogenic sarcoma accepted by the Registry for Bone Sarcoma of the A. C. S., only thirteen five-year "cures" were noted, and in nine of the thirteen, the histological structure was sufficiently atypical to raise doubt on the part of some of the reviewing pathologists as to the true nature of these tumors. Gibbon⁸ states that five-year cures are of the rarest occurrence. Magnusson¹² (Stockholm), reviewing thirty-nine cases from 1910 to 1928, recorded only seven alive, and Behring³ (Lund) an average postoperative survival in 384 cases of about one year. Gross⁹ (Vienna, 1870) measured a rapidly growing spindle cell sarcoma and found that it grew 33 inches in thirty-four months. Others are more slow growing. Adolescents are more prone to rapid invasion and metastatic involvement than patients over thirty years. In young children, growth is even more rapid. The longer it takes the tumor to develop, the more unlikely it is to be extremely malignant. As to location in relation to the degree of malignancy, medullary and periosteal types show

the same mortality. Brophy's grading should be fully utilized in determining prognosis.

SUMMARY

1. Osteogenic sarcoma occurs most frequently during the second and third decades.
2. It is frequently associated with trauma.
3. Microscopic examination of all removed tissue is essential.
4. The cell type is often not fully differentiated, thus confusing the pathological picture.
5. Pulmonary metastases are not always a contraindication to amputation.
6. The prognosis is poor, but an occasional patient survives.

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THE ALLERGIC FACTOR IN MIGRAINE

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IN discussing migraine, we may well start by discussing what we mean by migraine. In this study I have taken it to be a symptom complex consisting of a prodrome which may be a night of unusually good sleep, an unusual feeling of well-being, or a vague ill-defined depression. The prodrome is often absent. In a larger number of patients there is an aura, varying in different patients but almost always the same for the individual. This may be a feeling of numbness, or tingling anywhere in the body, usually the face, a one-sided blindness, flashes of light before the eyes, and other sensations. After this has been present from five minutes to several hours the headache comes on. Neither the prodrome nor the aura is necessary to the attack, and quite often the headache is present on awakening in the morning. The headache is usually one-sided, but may change from side to side during succeeding attacks and indeed during one attack. The ache is usually severe and may be actually prostrating. A personality change may occur which disappears at the end of the attack. Nausea is almost invariably present and usually vomiting. Occasionally the vomiting is the signal of the end of the attack. After the headache has lasted from twelve to forty-eight hours, it slowly disappears to be followed by a sequel which is again a remarkably recurrent sensation in those who have one. The most common one is a sense of complete fatigue, but it may be a dizziness, a craving for acid or unusual food, or the sufferer may feel better than in days. After the attack there follows a refractory period during which there is no recurrence no matter what is done. Not many patients with migraine have all the symptoms described, but all have headache and almost all have one or more symptoms.

The simplest description of allergy that I have found has been one by Rich in a recent paper on "Allergy in Tuberculosis":

"When a foreign protein finds its way parenterally into the animal body, certain changes take place in the

body as a result of contact with their protein. The exact nature of these changes is still obscure, but the effects which they may produce if the same protein reaches the tissues again, are quite familiar in the guise of the various 'hypersensitive reactions' to foreign protein. Depending upon conditions the reaction may appear in the form of anaphylactic shock, asthma, hay fever, serum sickness, food allergy, the Arthus phenomenon, or the tuberculin reaction. While these various conditions appear at first sight to be very different from each other, there is persuasive evidence that underlying all of them is the fundamental circumstance that the exposure of the body to a bland undigested protein, stimulates the production of a specific antibody, different for each protein, which has the power of reacting with the protein in some way, and that the different forms of hypersensitive reaction are results of the interaction of antibody and protein antigen under different conditions."

To connect these two apparently entirely unrelated conditions at first sight seems difficult. However, if the underlying mechanism of migraine is considered as follows, its allergic character may appear quite natural. From a study of the literature and a series of patients, it seems to me that the ultimate lesion may well be a wheel or a localized angioneurotic edema in some brain area, which may vary in location in different attacks but which disappears without trace. A transient edema is one of the characteristic evidences of an allergic reaction, *i.e.*, the result of interaction of antibodies and a protein antigen.

From a clinical point of view, the evidence in support of this proposition is: (1) the attacks are periodic and followed by refractory periods; (2) some cases follow Mendelian laws while others occur sporadically in allergic families; (3) age incidence corresponds to that of other allergies, with the onset most frequently in the first decade with a gradual decline in incidence toward middle life and few occurring after the fourth decade; (4) predisposing factors appear to operate as in other allergies; (5) eosinophilia occurs during the attacks; (6) many patients give positive skin reactions; (7) patients with migraine have more than their share of other allergic diseases.

From this point of view I have studied twenty-

*Read before the Hennepin County Medical Society, Minneapolis, March 15, 1933.

three patients. Of these seventeen had a history of migraine among parents, brothers and sisters, twenty-eight such relatives in all. Other allergic conditions were present in the families of eleven. Among the patients themselves, eighteen had other allergic conditions such as asthma, hay fever, urticaria, canker sores, eczema, Raynaud's disease, and susceptibility to plant poisons. The incidence of canker sores was especially high and in a remarkable number their occurrence was diminished by elimination diet.

In studying these patients, all were thoroughly interviewed not only as to their medical history, but also regarding food habits and special dislikes and idiosyncrasies. In addition to careful physical examinations skin sensitization tests were performed on almost all, using groups of antigens as arranged by Dr. Ellis of the Students' Health Service at the University of Minnesota.

In treatment, exclusive attention was paid at first to diet, eliminating all foods giving positive skin reactions and those to which the patient had a special dislike or a known idiosyncrasy. Rowe's elimination diets were also used. In the few patients who failed to get relief, other methods of treatment were also used later.

Of the twenty-three patients treated, seventeen gave their diets a fair trial. Of these, eleven obtained marked relief; three were somewhat improved, and three were definitely unimproved. Six we were unable to follow. The outstanding feature in the result of treatment was that the closer the supervision, the more intelligent the patient, and the closer the diet was followed, the better were the results.

CASE REPORTS

One young woman of twenty-nine had had severe headaches since the age of twenty-one. They occurred every four to fourteen days, and were severe enough to put her to bed for a day or two in almost every attack. By eliminating just eggs she had been entirely relieved of these attacks for over two and a half years. In that time she has had two attacks, one caused by eating an egg intentionally, and another by eating egg whites unknowingly in marshmallow candy. Thinking of a psychic factor we had her take an pseudo eggnog and she had no attack whatever. She also has slight attacks of nausea without headache after eating nuts or raw apples.

A woman of forty-four had had attacks of migraine since the age of thirteen. Each attack began with a "sinking in" of her right eye and she would "lick the

teeth" on the right side. Then she would have a pain in the right side of her head lasting twenty-four hours. She also suffered from severe hay fever. Elimination of coffee, fish, beets, spinach and onions, relieved her almost entirely, though she likes her food and eats of the "forbidden fruit" occasionally with reappearance of her headache. This woman had been treated with calcium and many other remedies previous to diet control.

A woman of thirty suffered from attacks of migraine since the age of three. Elimination of eggs, chicken, shellfish and walnuts has rendered her free of headaches since June, 1932, whereas previously they had recurred every three to seven days. This woman and both parents are quite brilliant but very erratic. Her two sisters, father, and maternal grandmother had migraine, and her mother suffers from hives after eating strawberries and tomatoes.

A woman of thirty-three, suffering from headaches every seven to ten days since before the age of ten had positive skin reactions to onions, cabbage, banana, and chocolate. She has seven brothers, four sisters and a father who have migraine. For thirteen months she has had attacks only when she has broken her diet.

A woman of thirty-two who had been having family trouble had attacks of sick headache since the age of fifteen. They began with what had been called spastic colon, which, after continuing for a day, gave place to a sick headache which was always heralded by pain in the angle of her right eye. She had found, herself, that these attacks followed the eating of fish and chocolate especially, and also of onions, melons, and bananas.

Since 1924, when Vaughan reported four cases of migraine relieved by diet elimination, there have been a number of additional reports, the outstanding ones being a series of sixty-two cases by DeGowin of Michigan, brought on by food and relieved by elimination of the same food; of 202 cases by Balyeat with over 80 per cent relief from food elimination, and by Rowe of California who reported relief in about 78 per cent of cases. In my small series the percentage of almost complete relief was 62, but many of my patients were seen at the Dispensary and I feel that even better results could have been obtained with closer supervision and better co-operation on the part of the patients.

In conclusion, I believe it is established that there is an allergic factor in the majority of cases of migraine and that treatment based on this conception and the use of diet control will effect a large percentage of good results. This percentage varies with the persistence and skill of the physician and the persistence and co-operation of the patient.

THE "DO'S AND DON'TS" OF THE INJECTION TREATMENT OF VARICOSE VEINS*

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THE writer has so often been asked what to do and what not to do in the injection treatment of varicose veins that he has felt that a paper bearing directly on this phase of the subject would be very timely. With that idea in mind this article is presented on the "Do's and Don'ts" of the injection treatment of varicose veins and ulcers.

Each case should be studied separately as to the history of its onset and progress. When did the veins in this particular case develop? Are they associated with injury, infection, pregnancy, phlebitis or are they congenital? Different types of veins will demand different treatment and precautions should be taken in some of them. If the patient gives a history of phlebitis, when did the phlebitis develop? Was it postoperative, postpartum, associated with pneumonia and was it of the superficial or deep veins? Was it localized or extensive? Does the history indicate that there was extensive damage done to both the venous and lymphatic systems. Was that damage more or less transient? Was it only in one leg or was it bilateral?

If there are ulcers present when did the first ulceration occur and what was its relation to the development of the varicose veins? Is the ulcer present a true varicose ulcer?

Other factors which should be taken into consideration are the age, habits and occupation of the patient. Judge and expect results according to the age of the patient and the circulation of the extremity. Sedentary habits and occupations are not conducive to rapid improvement of varicose ulcerations. On the contrary the patient should be instructed to walk a great deal, as will be discussed later.

PHYSICAL EXAMINATION

Much in the preceding paragraphs can only be gained during the course of a combined history taking and physical examination. It is impossible to elicit a complete history from the pa-

tient in the consulting room and it is only during the course of the examination that you are able to fully and completely arrive at the facts in the history of the case.

A routine general physical examination including that of the urine should be done on every patient. Neither a high nor low blood pressure is a contra-indication per se.

If the patient has diabetes and has bad varicose veins he should be treated, but naturally sugar preparations should be avoided. Be careful of your technic and avoid sloughs. If the patient has nephritis avoid any solution that might be an irritant to the kidneys.

If the patient has a cardiac condition with large varices present he or she will get wonderful relief and improvement in his or her general condition following a cure of the varicose veins. It is important, however, that no cases of broken compensation should have their veins treated during the decompensated state. *Never* treat any patient that is bedfast for any reason, cardiac or otherwise.

Definite pelvic pathology may or may not be a factor in the development of varicose veins. I believe that the patient has less possibility of post-operative complications if the veins are treated first and the pelvic operation put off until a later date.

The presence of "Resting Infections" so thoroughly discussed by deTakats² and others,⁶ should be recognized. It is far safer to treat this before the injections are started. It is best treated by local heat, moist and dry, with the patient in bed for a few days. The leg should be supported with bandages, stocking or casts when the patient is up and about.

Some of our most gratifying results have been obtained in the treatment of varicose veins during pregnancy. Here invalid mothers at mid-term have been made comparatively comfortable throughout the rest of the term.

Due recognition of the endocrine factor in the individual case cannot be emphasized too strongly. The large plethoric, hypothyroid individual

*Presented before the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 24, 1933.

with ulcerations on the lower legs is an example of this type of a case. Here we find large saccular veins feeding the ulcerations and lying in the superficial fat, which has become to a great extent fibrosed as a result of the chronic infection present. In addition to the sluggish circulation of the extremity, the patients are often so obese that they cannot get about with sufficient agility to properly make use of the effect of the calf muscles in walking. Experience has shown that the veins do not thrombose so well when embedded in thick fat while recurrences and new formations occur much more frequently. An evaluation of the above factors should be made during the examination.

ACTUAL TREATMENT OF CASE

a. In the injection treatment of varicose veins the one most outstanding, important and emphatic "Do" is that the patient *must* be kept ambulatory. The one great advantage of the injection treatment over the operative treatment is that the patient may continue to be about his work. It is imperative that the patient be ambulatory because the circulation of the leg is markedly increased by the systolic and diastolic action of the calf muscles when the patient is walking. When the patient is ambulant there is a very positive back pressure and reverse flow in every case of fully developed varicose veins. This backward pressure tends to force the thrombus more firmly down into the varicose vein and tends to prevent the formation of an embolus.⁹ This is exactly contrary to the idea held relative to this work previous to the past few years. Some surgeons in the past have insisted on their patients having bed rest for a period of ten days following treatment. Not so any more.

b. The factor of speed in the treatment of the individual case varies a great deal. In some it is of no importance whatever. Some patients would prefer to keep coming to the office twice a week for several months instead of having the work done quickly; other patients are on a vacation and wish to have work done then, while others come from a great distance, at much expense, and it is very important that the work be completed in the shortest time possible.

c. The temperament of patients must be considered. Some patients are of the lethargic hypothyroid type which do not notice pain or distress to speak of. That patient can be treated com-

pletely at one sitting and not mind it. If she has been subject to much pain and distress during her life she may not even notice or complain of the soreness occasioned by the chemical phlebitis following the treatment. On the contrary there are many patients of the nervous, neurotic type, under high tension, who have never been subject to pain or distress and who complain markedly about the mere prick of the hypodermic. Often a patient will faint while being given a single injection. In such a case make no attempt to give extensive treatment at a single sitting but instead advise the patient to have this treatment completed in many sittings with one or two injections at a time. Let the extent of the treatment at a single sitting be in a measure judged by the size, extent and location of the veins. As stated above, never treat the patient so extensively, completely and radically that he will be incapacitated and made bedfast. The veins about the ankle seem to be the most tender and painful of all, following injections. The veins in the popliteal space also give the patient much distress and if extensive or large and saccular should be treated separately from the rest in order that you may carefully continue the post-operative support to the chemical phlebitis or venitis which develops.

d. Finally, treat every patient according to the theory of the treatment. The theoretical principle underlying the injection treatment of varicose veins is that we wish to inject into the vein lumen some substance which will react on the endothelial cells of the intima, causing a definite injury to it which will provoke the formation of a thrombus. These solutions are prepared in many different strengths and with varying destructive powers. It must be remembered that stagnation of the blood current in the vein and localization of the injected fluid are the two principal factors in this treatment. Next, the solution that we inject should be injected in a known strength. By that I mean that if we wish to use a 5 per cent, 50 per cent, or 75 per cent solution we should do our best to inject that particular strength and then retain it so. Do not inject any solution into a vein full and distended with blood, because of the dilution which will result. This dilution, of course, cannot be accurately measured. With experience one can determine the preferable strength to use, as well as the length of time that it should be held localized in order to obtain results. This will naturally vary with the

solutions used and with the types of veins in different locations. The varicose veins of blond individuals seem to be more easily affected than those of dark brunettes. The venitis is more severe in blonds. Finally, in order to accomplish the above theoretical principles each doctor must use his own judgment as to the method which can most definitely accomplish the desired results.

MY OWN IDEAS

a. The theory of the treatment is, as stated above, that we should inject into the empty vein some destructive solution of a known concentration, retaining it there under control as long as is necessary. This is done by making use of tourniquets and the back pressure from the deep veins outward through the communicating veins. This is easily controlled by either elevating or lowering the extremity being treated. Of course it is impossible to introduce the needle into an empty vein but theoretical perfection should be approached as nearly as possible by any method preferred. The work done and presented elsewhere⁹ by the injection of skiodan under the fluoroscope proves most clearly that the solution can actually be localized and retained where desired by the above method.

b. The blood pressure readings⁹ prove the source of the reverse flow and why the tourniquets are of value.

c. Endeavor to inject the right amount of solution. Never inject more than enough to barely fill the varix being treated. It is wrong to inject large amounts of any solution into any vein filled or distended because that solution will not be retained locally, but will pass directly through the communicating veins into the deep system. In small amounts this would cause no damage, but if large amounts are used and the patient's circulation is poor and tourniquets are applied real tightly there is definite danger of producing an injury to the deep veins.

d. The number of injections at a sitting vary with the individual case. Often I give only one injection, while in other cases I have given as many as twenty-five to thirty.

e. At each sitting when the treatment is finished, it is of *definite* value to drain the injected solution from the treated area, otherwise there is a possibility that it may continue with its destructive action locally longer than desired and may cause true complications such as sloughs or

extensive periphlebitis. When the treatment is finished, elevate the leg, drain the solution out, withdraw the needles and apply gauze sponge pressure directly over the needle puncture before the extremity is lowered.

f. The postoperative care and treatment of these cases is most important. In all this work I wish to emphasize either *do it right or leave it alone*. I am more positive all the time of the relative value of the minor points in the treatment and these are in no place more outstanding than in the post-operative care. You first do your best to retain the solution locally just long enough to give you the desired destructive result. Then attempt to collapse the large varices so that when the resultant thrombus forms it will be not more than one quarter inch in diameter instead of as large as your thumb. The venitis and periphlebitis following the treatment causes pain and tenderness and the support of the Ace bandage, adhesive plaster, Elastoplast bandage, Unna's cast or the elastic stocking should be given. The choice will rest with the physician and the case. Local heat, either moist or dry, also tends to relieve the soreness of the reaction.

g. In order to obtain the best results the doctor must carefully and consistently give follow-up care and inject all new varices appearing or reinject those veins not completely and perfectly thrombosed. Lack of attention to these points explain most failures.^{1, 4, 5, 8}

h. I am convinced that it is most essential to have the great saphenous completely and firmly thrombosed to the groin in order to assure a permanent result. It is difficult to locate this at times except by means of the P.P.T. (percussion pulse transmitted).⁸ By this simple percussion test the great saphenous is very easily located although it may lie deep in the fat and not be detectable by ordinary means. It is useless to expect a permanent result following the injection of veins in the lower leg, regardless of what solution is used, as long as we have the hydraulic effect of the great saphenous, open as large as your thumb, with a reverse flow forcing downward from above tending to recanalize the treated and thrombosed veins.

SOLUTIONS USED

The choice of solution varies with the individual physician as well as the patient to be treated. There are many solutions that are very

effective from the clinical viewpoint and results obtained. I have discarded practically all of the solutions causing intense and severe cramps because many patients are reluctant to return for further treatments on account of them. Solutions causing the most severe cramps are: (1) sodium salicylate; (2) sodium chloride (20 per cent); (3) the sugar and salt mixtures. The latter, however, are very efficient when used with discretion and the associated use of a moderate sedative. For the majority of my work I prefer, first, sodium morrhuate in the 3, 5 and 10 per cent strengths; second, the quinine and urethane solutions, and third, the sugar and salt mixtures.

COMPLICATIONS OF TREATMENT

a. The most common complication following the injection treatment is the development of a phlebitis either chemical or infectious. The infectious phlebitis should not occur but at times it happens even with the best of technic. deTakats has discussed this at length under the subject of "Resting Infections."^{2, 6} The best treatment is bed rest, hot packs and elevation of the affected part.

b. The occurrence of sloughs should be a thing of the past. If they do occur, treat them exactly the same as a varicose ulcer. The application of hot packs for the first twenty-four hours very materially lessens the pain. Following this, apply the rubber sponge and Ace bandage just the same as to an open ulcer. When the slough and gangrene shows its line of demarcation then excise it as it separates. Do not attempt to completely excise the slough early and hope that it will heal by first intention, as it seldom will do so. The open ulcer which will remain when the wound breaks down and lies wide open following the attempted excision leaves much more of a scar after its healing than would the original slough.

c. I do not believe that gangrene of a leg can develop following the injection treatment of varicose veins as the solution is injected into the vein and not into the artery. Such cases have been reported. Gangrene of an extremity can come only from a blockage of the arterial supply and I do not see how it would be physiologically possible for this to develop following the injection of any solution into a vein.

THE COMPLICATIONS AND END-RESULTS IF VARICOSE VEINS ARE NOT TREATED

a. The most common complication is the development of an acute, infectious thrombophlebitis. This may be either of the superficial or deep system, and it may be either localized or extensive. For all cases of infectious thrombophlebitis of the deep system I believe the most satisfactory treatment is rest in bed with the extremity in elevation and wrapped in hot packs. The application of the electric baker for half an hour twice a day seems to be an adjunct to this treatment. If the phlebitis involves the superficial veins all the way to the groin then the same treatment is used. If the phlebitis is *localized* to an area in the *superficial* system with large loops of veins above open and filled with blood but not thrombosed, the treatment is entirely different. Here the author would emphasize the immediate injection and thrombosing of the veins above the area.⁶ This I believe is a very marked advance in the treatment. In the past it has been absolutely forbidden to inject any vein for a period of one to three years following the presence of an infectious thrombophlebitis. We know now that this is positively wrong. For this kind of a case use quinine and urethane or sodium morrhuate. Do not inject one segment and then leave the rest but on successive days inject those segments above until the vein is completely thrombosed to the sapheno-femoral opening. In the presence of a resting infection or acute phlebitis in a great saphenous vein which is unusually large, I advise high ligation as close to the femoral opening as possible.^{3, 12} Start the injections the day after the ligation. Do not forget the use and value of external support to all these inflamed areas during the course of treatment after the patient is up and about.

b. Another complication is eczema and pruritis. Do not hesitate to inject the veins associated with this condition. The veins are the causative factors and the condition will improve more rapidly following their injection than it will following the application of solutions and ointments alone. The combined use of both methods is by far the best.

c. Varicose ulcers are a very common and serious complication. Make a careful differential diagnosis of the case as the first point in the treatment.

TREATMENT OF VARICOSE ULCERS

If varicose veins are present and associated with varicose ulcers then all that has been said above applies.¹¹ In fact, it is more important and urgent to inject the varicose veins here than in the simple uncomplicated case. There usually is much congestion, edema and cellulitis associated with the ulceration. There is no object in injecting a vein in an area of cellulitis but the vein above and outside this area of cellulitis should be injected as soon as possible. The technic of the injection in such a case is just the same as discussed above. Clinical experience has proved that veins will thrombose very poorly in areas of extensive cellulitis, edema and fat. These cases should be treated by injecting the veins above, with the application of the ulcer treatment to the ulcer and cellulitis area below.

Too much importance cannot be given to the actual treatment of the ulcer itself with its associated area of cellulitis and edema.⁷ This has been discussed fully elsewhere and I only wish to reemphasize that treatment. The mechanics of the rubber sponge and Ace bandage in connection with the systolic and diastolic effect of the calf muscles while the patient is walking is clear and positive. Clinical experience most perfectly bears out the accuracy of the theory underlying the principle. Dress the ulcer with pure, thick balsam of Peru. Over this area place a gauze dressing with a layer of some mild ointment, then apply a sufficient amount of gauze and sheet wadding to protect the skin from the rubber sponge which is then applied accurately over the ulcer. Be sure to apply a good grade of rubber sponge and not a soft one. The more firm and resilient it is the better. This is bound in place with a plain gauze bandage. The entire lower leg including the rubber sponge is then wrapped tightly with a four-inch Ace bandage. This entire dressing should be changed every two to four days.

In all extensive cases of varicose ulcers use the seed implantation graft of Braün.¹¹ Continue the use of the rubber sponge and Ace bandage following the skin graft the same as for any ulcer. Many ulcers seem to heal and close rapidly following adhesive strapping, restrapping ulcer every five to seven days. Following the healing of the ulcer be sure to continue your supportive treatment. The Unna's cast is best for the first month or so followed by the elastic stocking or

bandage for several months thereafter. Support should be maintained to the extremity as long as any edema is present.

The plethoric hypothyroid individuals with ulcerations need endocrine medication and reducing diet as well. They will recover more rapidly and the veins will thrombose more firmly when injected if they are put on a strict obesity diet with thyroid medication until they show a definite *plus* basal reading. The addition of parathyroid to the treatment very definitely helps some patients, though not all.

In conclusion let me list the "Do's and Don'ts" of the injection treatment as follows:

"DO'S" OF THE INJECTION TREATMENT

1. Study the case history.
2. Examine case carefully.
3. Watch for areas of "resting infection."
4. Keep patient ambulatory.
5. Consider temperament of patient.
6. Choose solution for the case.
7. Follow theory of treatment.
8. Mark veins to be injected while patient is standing.
9. Adjust posture of leg and patient during treatment to suit the individual case.
10. Leave tourniquets applied five to ten minutes after injections.
11. Make multiple injections if needed.
12. Apply and maintain gauze sponge pressure at point of injection immediately upon withdrawal of needle.
13. Inject all patients that show a positive, negative or double Trendelenburg. Use Perthe test in doubtful cases.
14. Inject pregnant women the same as others. Give more care to post-injection support in these cases.
15. Inject labiocytes when painful.
16. Inject patent varicose veins starting from four to six inches above area of acute infectious thrombophlebitis and continuing to groin.
17. Re-inject vein if thrombus is not hard up to sapheno-femoral opening.
18. Ligate pre- or postoperative as preferred. Ligate high or not at all.
19. Anticipate and explain soreness following injection treatment.
20. Support inflamed veins.
21. Inject all varicose veins in ulcer cases as soon as the edema and cellulitis have improved.
22. Use rubber sponge and Ace bandage on all ulcers and sloughs.
23. Wrap ulcer and sponge tightly. Emphasize walking.
24. Use Braün seed skin grafts for all large ulcers.
25. Use rubber sponge pressure and support following the implantation of skin grafts.
26. Strap ulcer with adhesive if it does not respond to the usual sponge treatment.

27. Continue support and care to ulcer cases after they are healed.
28. Remember the association of a hypoactive thyroid and parathyroid with ulcer complications.
29. Study and treat each and every case individually.

DON'TS OF THE INJECTION TREATMENT

1. Don't overtreat patient. Keep him ambulatory.
2. Don't worry about emboli but remember their possibility.
3. Don't forget asepsis. Always be careful.
4. Never inject if not sure needle point is in vein lumen.
5. Don't inject if you have punctured posterior wall of vein.
6. Don't be afraid to inject veins in thigh up to groin.
7. Don't inject large amounts of any solution in one varix.
8. Don't inject if vein is distended.
9. Don't inject over crest of tibia or over malleolus.
10. Don't forget that a quarter inch thrombus is the ideal thickness.
11. Don't forget that all extensive cases of varicose veins show a Trendelenburg positive or double test.
12. Don't excise sloughs. Use hot packs early. Later treat same as ulcers. Remove necrotic tissue.
13. Don't use silver nitrate for one week after the implantation of the seed grafts.
14. Don't hesitate to give patient a few more injections than you planned at first without extra charge.
15. Don't claim or promise too much. Recurrences and new formations do occur.
16. Don't discharge patient. Watch for new veins every six months to one year.

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CASE REPORTS

FECAL INCONTINENCE WITH MEGACOLON*

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We are presenting the following case of chronic fecal incontinence in a child because of: (1) its rarity; (2) its definite association with a spina bifida; (3) the fascinating study of neurological function that it offered, and (4) the therapeutic problem it presented.

The patient was a boy seven years of age, who was first seen August 26, 1932.

The family and past history were irrelevant.

His complaint was a fecal incontinence of six months

duration. Prior to that time he had no incontinence at any time, nor has he ever had any enuresis.

Since the onset, the child would have incontinent stools two to three times a day. He would pass small stools—usually hard, marble sized balls, but at times he would have a mass of softer, but definitely normal, pasty feces in the gluteal fold. This incontinence was more frequent in the evening but might occur at any time of the day or night. The patient seemed to pass these small stools without any conscious recognition of the act and the small hard lumps were frequently found scattered about the house. The child sometimes appeared ashamed of his incontinence; at other times he seemed in no wise disturbed. However, he is not a mentally retarded child and is up in his school work.

Physical examination was negative throughout, his height and weight being about normal.

*Presented before the Northwestern Pediatric Society at the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 22, 1933.

Digital examination of the rectum showed the external sphincter possibly a little relaxed. There was a constant large fecal mass in the rectum. The sphincter reflex was normal and there were no sensory or motor disturbances of the gluteal region or of the lower extremities.

Chirurgical for 1930, report a case in a girl of twelve years who had a fecal incontinence from infancy. The only abnormal physical finding was a relaxed, gaping anal sphincter. X-ray showed a spina bifida of the second sacral arch. Freeing the nerves from the mass of fibro-adipose tissue by operation resulted in a cure.



Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 1. Barium enema showing marked dilatation.

Fig. 2. Partial evacuation of enema showing diminution of size and return of haustrations.

Fig. 3. Installation of air following evacuation of barium.

Fig. 4. High barium enema five months later: showing that although patient has been functionally well for five months, the bowel still dilates when overloaded by barium enema under pressure.

Sigmoidoscopic visualization showed a widely dilated rectum and sigmoid. There was no evidence of mechanical obstruction (Dr. H. W. Christianson).

Opaque enema showed a very large, redundant colon with a constant mass of feces in the upper rectum. Following partial evacuation, the colon was less large and showed fairly good haustrations. No obstruction of any kind was observed.

X-ray examination of the spine shows a lack of fusion of the first sacral arch, appearing as a spina bifida occulta. The spinous process of this segment seems entirely absent.

Diagnosis: (1) Fecal incontinence; (2) Megacolon; (probably secondary to a spina bifida occulta).

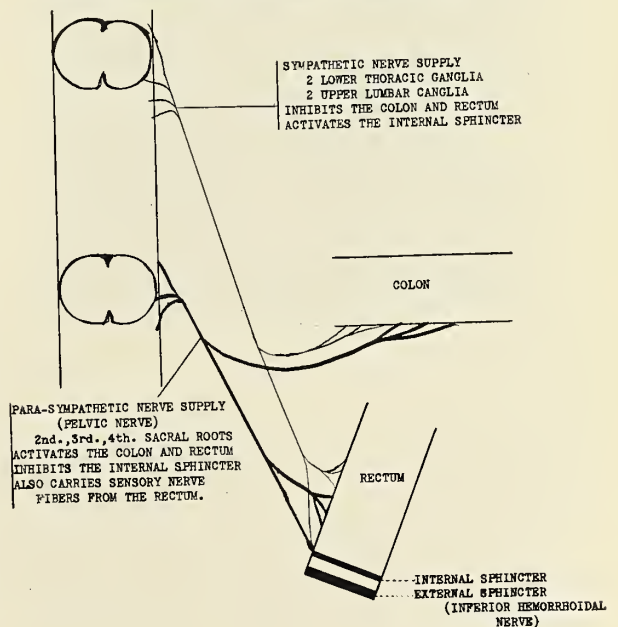
In so brief a time the differential criteria can be only briefly mentioned.

Could this megacolon be congenital, that is, the Hirschprung's type? Hirschprung's disease is usually associated with an obstinate constipation from early infancy—sometimes accompanied by periods of paradoxical diarrhea; further a large abdomen is always present. This patient gave no such history, the first disturbance being noted at six years. Megacolon secondary to peripheral obstruction is frequent in adults and rare in children but is well ruled out here by x-ray and proctoscopic examinations. We feel that this moderate megacolon is secondary to the spina bifida.

In spina bifida occulta the bony defect and the associated dural defect are filled with a mass or pad of lipomatous and fibrous tissue, which usually extends down into the spinal column and may envelop some of the spinal nerves. Impingement upon nerves occurs from contraction of the fibrous tissue bands or from the relative shortening of the spinal cord that results from the less rapid growth of the cord as compared to the vertebral column. The resultant symptoms depend on the nerves involved, and vary from urinary incontinence to flaccid paralysis of the lower extremities.

In a rather thorough perusal of the literature we frequently noted the statement that spina bifida might be a cause of fecal incontinence, but definite case reports seem lacking. P. Santi et Cibert in the Lyon

SCHEMATIC REPRESENTATION—NERVE SUPPLY OF THE LARGE BOWEL



These men make no statement of the neuro-mechanism involved, but the findings suggest involvement of the spinal nerves to the external sphincter.

Brief mention may be made of the physiology of the lower bowel from a neurological standpoint, in the light of our present knowledge.

The true sympathetic group of nerves, formed chiefly by the ninth thoracic to the fourth lumbar ganglia with their corresponding rami communicantes, maintains a functional unit, and may be termed the "filling nerve,"

since it has an inhibitory action on the large bowel and is the activator nerve to the internal sphincter.

The parasympathetic group, formed by the second, third, and fourth sacral ganglia with corresponding communicating rami to and from the cord, makes up the pelvic nerve, which may be termed the "emptying nerve" since it activates or contracts the colon and rectum but inhibits or dilates the sphincter. Further, this nerve group carries the sensory fibers from the rectum—a point of importance in this case.

It is the balanced interaction of these mechanisms that controls bowel function and reflex defecation. That involvement of this mechanism may produce megacolon has been shown experimentally by Adamson and Aird (British Journal of Surgery, October, 1932). These men produced a progressive megacolon in cats by the surgical section of the parasympathetic roots, thus causing a loss of parasympathetic activation of the large bowel with a resultant sympathetic inhibitory preponderance.

Since a spina bifida at the first sacral arch might involve any of the communicating rami of the parasympathetic ganglia, and particularly might involve the afferent fibers from the rectum which are concerned not only with reflex mechanisms but also with cerebral consciousness of rectal filling and emptying, the following deductions as correlated to the presented case seem probable:

1. Loss of parasympathetic activation of the large bowel resulted in a partial megacolon, noted only if the colon was overloaded, and not associated with muscle hypertrophy or primary colon disease.

2. The reflex act of defecation was interfered with.

3. The loss of filling sensation in the rectum suggests how small amounts of stool might have been passed without the knowledge of the child.

4. Loss of sphincter tone occurred because of: (a) the persistent presence of a large fecal mass in the rectum, mechanically producing a partial paralysis of the sphincter; (b) lack of stimulation to the sphincter through the reflex arc tonus.

5. Frequent small stools were the result largely of a mechanical process. The small hard lumps were forced out by the accumulating fecal mass in the dilated rectum. Clinical observation verified this: when the child had a full rectum, incontinence occurred; when his rectum was kept fairly empty, no incontinence occurred.

Treatment was directed at decreasing the normal strain on the weakened functional control of the affected region of the bowel. Primarily it was necessary to keep the rectum fairly empty to avoid overload and to help the sphincter resume its tone. This was done as follows: The child was given frequent clemastin to keep his rectum empty. He was given a low residue diet and a large amount of carbohydrate to favor bacterial growth and produce a soft, acid stool. Phenolphthalein was given to stimulate peristalsis. For about three weeks the patient did not show much change; then a rapid improvement occurred. For the past five months he has had absolutely no incontinence. He has usually two soft, acid stools daily. The sphincter tone has improved, indicating that the previous large fecal mass had affected its tonus. The colon and rectum are still enlarged, if overloaded (as by a barium enema), but the size diminishes considerably on partial evacuation, indicating an absence of obstruction or of muscle wall disturbance.

At present the boy not only has no incontinence but is much happier, eats well, and is gaining nicely. Though not cured physiologically, he is apparently cured clinically. The bowel will probably function normally, if the weakened portion is not given an excessive load.

SUMMARY AND CONCLUSIONS

1. A case of spina bifida occulta with resultant megacolon and fecal incontinence is presented.

2. The rarity of spina bifida with fecal incontinence and no urinary incontinence is noted.

3. The neurogenic mechanism of lower bowel control is described.

4. The mechanism of spina bifida in causing fecal incontinence and megacolon is discussed.

5. Medical therapy directed at overcoming the faulty physiology was given and a clinical cure observed thus far for five months has been obtained.

6. The necessity of surgical treatment, with its risk and uncertain results, has been at least temporarily obviated.

PRIMARY CARCINOMA OF THE LIVER*

REPORT OF CASE IN A SIX MONTHS OLD INFANT

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This case is being reported as a very rare and interesting condition, and as a reminder that in the differential diagnosis of any enlargement of the liver, malignancy must be considered, regardless of age.

In 12,000 autopsies, White reports only eleven cases of primary carcinoma of the liver but does not mention the age incidence.

Briggs, in a recent résumé of the literature states that Griffith collected fifty-seven cases of primary carcinoma of the liver in children from one to sixteen years of age, and Danse collected twenty-three cases in children less than two years old.

Carcinoma of the liver is usually an expression of malignant changes in other parts of the body but the literature on primary malignant changes in the liver is being constantly enlarged.

Time does not permit of any enlargement upon etiology, types, or liver changes in these cases.

The patient was a six months old white infant entirely breast fed from birth. Delivery had been normal. There had been no intercurrent illnesses. The family history was entirely negative. There was no history of malignancy in the family.

Nothing unusual was noticed until a few weeks before admittance to the hospital, when the baby became fretful. The stools were greenish and more frequent. One week before a physician was consulted, the mother had noticed the baby's abdomen was becoming larger and he was acting as if in pain. At this time Dr. Beals was consulted. A few days later the abdomen became suddenly greatly distended. I saw the baby with Dr. Beals on March 25th. The baby was extremely pale and the abdomen was greatly distended. The liver was tremendously enlarged and numerous nodules were felt over the surface of the liver.

On admission to the Children's Hospital, the blood showed the hemoglobin to be 34 per cent, white cells 17,750, red cells 2,350,000. The differential count was normal. A liver puncture was done and blood under great pressure was obtained. The child expired on the second day after admittance and an autopsy was granted and performed by Dr. Ikeda, the essential parts of which follow.

NECROPSY FINDINGS

The body is that of a male child 67 cm. in length and approximately twenty pounds in weight. Rigor is absent. No hypostasis, no cyanosis or demonstrable jaundice. The skin and mucous membranes are pale and waxy. A puncture mark is present in the mid-epigastrium over an abdominal mass which occupies the upper half of the abdomen and distends it enormously. The subcutaneous fat is scanty.

*Read before the Annual Meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 22, 1933.

The peritoneal cavity contains a few cubic centimeters of fresh blood. The liver occupies two thirds of the cavity. It extends 12 cm. down from the costal margin in the right mid-clavicular line, 10 cm. from the xiphoid process and 4.5 cm. from the left costal margin. In the mid-axillary line, it extends 11 cm.

ment simulating the hepatic architecture. More or less fat globules are noted in the cells, in some areas this feature predominating the picture. Large blood spaces, areas of hemorrhage and necrosis of the tumor tissue are noted in various part of the section. Wide bands of connective tissue extend into the tumor from the



Fig. 1. Photograph showing the marked enlargement of the abdomen.



Fig. 2. Lateral x-ray of the abdomen showing the tumor mass.



Fig. 3. The liver removed and incised.

from the costal margin on the right and 2 cm. from the margin on the left side. The right lobe thus extends clear across the abdomen to the left flank. The liver is loosely adherent to the diaphragm, which is thickened, roughened and hemorrhagic on this side. The appendix is normal. The diaphragm extends to the fourth rib on the right and to the fifth rib on the left.

The liver weighs 1,040 grams. It is 25 cm. across, 14 cm. in height (above downward) and 13 cm. in thickness (before backward). The left lobe shows a smooth, pale, yellowish-brown capsule. The right lobe is rounded and the superior and inferior surfaces show irregular, nodular, subcapsular masses. The capsule is adherent to the diaphragm lightly. The capsule is stretched and shows irregular yellowish and reddish spots of the tumor through it. The cut surface of the right lobe shows a large, well defined, rounded, nodular tumor mass about 13 cm. in its greatest diameter occupying the substance of the liver with a narrow zone of parenchyma partly around it. The mass consists of a soft, mushy, greenish-gray tumor tissue with areas of hemorrhage. The center of the mass is occupied by a large clot of blood and serum from which liquid blood escapes freely. The tumor mass is definitely demarcated from the surrounding parenchyma and the capsule, which is thickened and tightly encapsulates the greater part of the mass. It bulges out on the cut surface and is easily broken. The cut surface of the left lobe is pale yellowish-brown, cloudy and fatty. The gallbladder is normal. The gastrointestinal tract is normal.

The spleen, kidneys, adrenals, testes and thyroid glands are normal.

ANATOMICAL DIAGNOSES

1. Primary adenocarcinoma of the liver with central necrosis and hemorrhage.
2. A single metastatic nodule in the right lung.
3. Probably direct extension of the tumor to the right diaphragm.

Liver.—The tumor consists of medium size cells with hyperchromatic nuclei and a spacious, granular "foamy" cytoplasm with tendency to form cords with arrange-

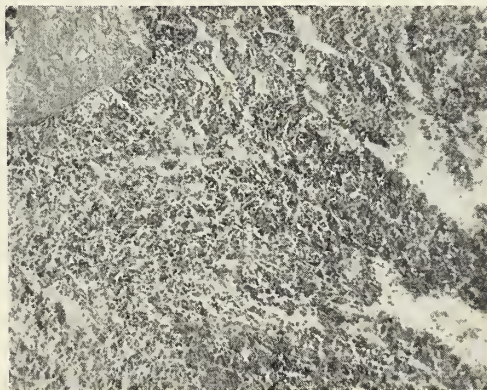


Fig. 4. Microscopic appearance of primary adenocarcinoma of the liver.

thickened capsule. Massive infiltration of leukocytes and proliferation of fibroblasts along the periphery of the blood mass is seen. No bile pigments are noted within or about the tumor cells. No biliary ducts are observed. Section of the left lobe shows cloudy swelling and fatty infiltration of the parenchymal cells with a slight atrophy of the cords.

Lungs.—Lung shows a single well encapsulated nodule about 5 mm. in diameter consisting of the cells of the type noted in the liver tumor. The cells form a more solid mass but show fine alveolar septa with suggestion of cord arrangement. Several large, blood filled spaces are noted within the tumor. Otherwise, lung is normal.

Diaphragm.—The muscles are definitely hypertrophied. The hepatic aspect is covered with a thick, irregular layer of organizing fibrin-blood over a narrow zone of granulation tissue showing fibroblastic proliferation, hemorrhage, edema and a few infiltrates. Whether or not some of the cellular elements are tumor cells can not be stated definitely.

MICROSCOPIC DIAGNOSES

1. Primary adeno-carcinoma of the liver (liver cell type).
2. Metastatic nodule in the lung.
3. Non-suppurative inflammation of the diaphragm with peri-hepatitis.

DOUBLE ILEAL INTUSSUSCEPTION

J. E. ENGSTAD, M.D.

Grand Forks, North Dakota

J. J., aged 5, was admitted to my services at the Deaconess Hospital, March 3, 1931, giving a history indicating intestinal obstruction. The young patient was in a state of collapse with rapid pulse, subnormal temperature, and marked abdominal distention. A large dense mass could be palpated in the ileocecal region. After a stimulating regime, he was taken to the operating room with the diagnosis of intestinal obstruction.

Under ethyl anesthesia, a McBurney's incision was made and considerable clear fluid escaped through the incision. A large mass was found inside the lumen of the cecum with a dense pedicle in the ileocecal valve. A double ileal intussusception into the cecum was determined.

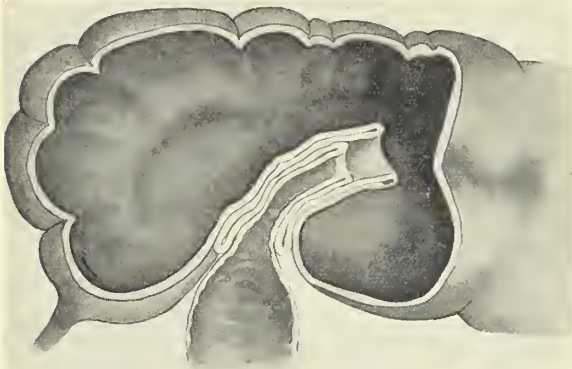


Fig. 1.

With gentle traction the intussuscepted loop was delivered out of the cecum. The ileum was found to be necrotic for a distance of about 6 inches, extending at its distal end to a point a little over a half an inch from the cecum. This small distal end of the ileum was of sufficient length to serve as a good cuff for an end-to-end approximation.

The necrotic mesentery was first excised by a V incision of sufficient depth to include all the thrombosed blood vessels, and all bleeding points were ligated. The gut was then milked empty of its contents and clamps properly applied. The necrotic mass was excised in such a manner that no infective material touched the mesenteric part of the bowel. A modified lock stitch, including both layers, joined the severed ends, leaving as small a hem as possible with a view to minimizing the hazard of a damming action on the intestines. The serosa was further reinforced by a number of Lambert silk sutures. The toilet was most difficult, due to the enormous dilation of the bowels, which had extruded from the abdominal cavity during our rather hurried technic. Some relief was accomplished by aspirating the gas from a couple of the largest loops. The incision was loosely sutured with catgut, a rubber gauze drainage being instituted.

In the middle of the night I was hurriedly called to

the hospital and on inspection a large mass of intestines were found under the bandage, the intra-abdominal pressure having forced the intestines through a very small space between the sutures. The patient's general condition had improved, and his bowels were moving freely. All sutures were severed, and all loops replaced with the exception of two or three segments that seriously objected to being put back in their normal position. They were left outside, as the danger of sharp kinking and agglutination was of greater menace than their extrusion.

The bowels were dressed with warm vaseline twice a day, and covered with warm, moist saline gauze. A marked atelectasis of the right lung occurred, which was a factor which precluded any extensive manipulation of the intestines. The extruded loops thrived well, and functioned perfectly. Gradually as the pulmonary complication improved, the segments were from time to time forced back into the cavity, but part of one segment became agglutinated to the edge of the incision, and refused to budge. Gradually a film covered the extruded loop, which in time contracted to such a degree that after six months' time the skin had closed over the wound, the fascia had approximated, and there were no evidences of any firm adhesion of the segment to the serosa.

The patient is enjoying excellent health up to date. On straining, only a slight bulging is demonstrated under the scar.

HEPATEX P. A. F. NOT ACCEPTABLE FOR N. N. R.

The Council on Pharmacy and Chemistry reports that Hepatex P. A. F. (Evans Sons, Lescher & Webb, London, England; Thomas A. Hedley, New York, American agent) was submitted for the Council's consideration as another liver preparation for intravenous and subcutaneous administration in the treatment of pernicious anemia. It is stated that 5 c.c. of the preparation represents 100 Gm. of mammalian liver. The information supplied concerning the preparation of the product appeared to be in most respects consistent with the methods described by Cohn et al. for purifying liver extracts suitable for intramuscular and intravenous administration; however, the statement is made that from the watery extract "the protein matter and other inactive constituents are removed by a special secret process," and no further information as to this process was supplied. The firm was informed that the product might be made acceptable (a) if the proprietary name was replaced by a descriptive name, such as "Liver Extract for Intramuscular Use"; (b) if the recommendation for its intravenous use was discontinued or convincing evidence of its safety submitted; (c) if the objection to the "secret process" was removed, and (d) if the claim in the advertising circular that the product is recognized all over the world as "the best preparation of its kind" was abandoned. In its reply the firm stated that its product has been used in some hundreds of cases without a report of untoward effect; that it is not willing to disclose the details of the "secret process" by which the product is obtained. The firm has not indicated willingness to withdraw the claim "the best preparation of its kind." The Council declared Hepatex P. A. F. unacceptable for New and Non-official Remedies because it is marketed under a proprietary, insufficiently descriptive name without adequate declaration of composition, because there is no adequate evidence for the safety of the recommended intravenous use, and because the claim that the product is "the best preparation of its kind" is unwarranted. (Jour. A. M. A., November 12, 1932, p. 1690.)

PRESIDENT'S LETTER

IT IS with a combined sense of a great responsibility, and a belief in the almost universal approval by the medical men of the state of what the state medical association has done in the past ten years in meeting the problems presented, that I assume the duties of President of our State Association.

Each year presents new problems, and their solution is not a one man job. They call for continued loyalty and support from every quarter of the state.

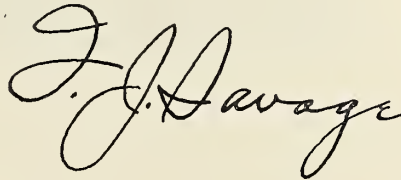
We may well be proud of the accomplishments of the past ten years—particularly along economic lines. That so great a percentage of effort by the State Association has been given to economic affairs needs no apology or defense. If this had not been true, the individual county societies would be in a sorry plight today; the state would be overrun by the cults, and quackery would be flourishing. Nowhere is the fable of the bundle of sticks better illustrated than in the relationship of the component societies to the state association.

In common with many previously expressed opinions from all over the country, my belief is that the steady overproduction of physicians is the biggest problem we face. Any action on our part cannot settle the questions for the entire country, but Minnesota can start the ball rolling.

It is not reasonable to expect that the initiative in this matter will originate in our medical schools when the final decision rests with the department of administration and the board of regents. The fees from medical students at our university go into the general fund. The physical equipment is designed for a certain number of students—roughly, double the number adequate for the needs of the state. Our population is approaching a stationary point, and in another twenty to thirty years will probably become fixed. And still the flow of young physicians continues. It is obviously unfair to do the weeding process after a man has spent five years in study. The system of the Harvard law school, in which 25 to 30 per cent of the freshman class are weeded out, is a much fairer system. But in the final analysis, a definite quota system of selection of those to be allowed to start the study of medicine seems the most fitting solution of the problem.

The number of Americans studying medicine abroad today is estimated to be as high as 5,000. If all physicians applying for licenses in Minnesota who have received their medical education outside the U. S. were first required to obtain a license to practice medicine in the country in which they received their education, this requirement would eliminate a good percentage. This rule has been adopted by the National Board of Medical Examiners.

We have a committee of men of sound judgment and broad experience who have the investigation of this problem in charge. Let us realize clearly that no selfish and narrow considerations guide us in this matter; the welfare and high standards of the medical profession of the future are at stake.

A handwritten signature in cursive script, reading "J. J. Savage". The signature is written in dark ink and is positioned above the printed name of the president.

President,
Minnesota State Medical Association.



F. J. SAVAGE, M.D.
President, Minnesota State Medical Association

EDITORIAL

MINNESOTA MEDICINE

Official Journal Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine, and Minneapolis Surgical Society.

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All advertisements are received subject to the approval of the Council on Pharmacy and Chemistry of the American Medical Association.

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Vol. XVII January, 1934 No. 1

welcome discovery for the child that hates cod liver oil.

Animals fed on diet deficient in vitamin A do show a cornification of the mucous membranes and their susceptibility to infection. The assumption seemed warranted that the addition of vitamin A to a child's diet would, therefore, tend to prevent infection. The average child with his susceptibility to acute respiratory infections has no symptoms of vitamin A deficiency.

Hess mentions Wolff's finding that the livers of 60 per cent of newborn babes contained no vitamin A. The incidence of pneumonia in babes under six months however is very low compared to that in the second six months or second year of life—a further indication that vitamin A deficiency has nothing to do with development of pneumonia.

There are certain conditions which doubtless indicate the addition of vitamin A to the diet. A child with xerophthalmia with its susceptibility to pneumonia and other infections simulates the vitamin A deficient animal. A child with a chronic diarrhea, or one on an anomalous diet, an adult suffering from chronic alcoholism or intestinal parasites, or a man such as a coal miner working in unsanitary surroundings conceivably should be benefited by the addition of vitamin A to the diet. Jeans found that 20 per cent of children applying to a certain hospital had diminished acuity of vision in the dark which responded to cod liver oil. In sick children the vitamin A deficiency may be more common than is generally recognized.

The vitamin preparations will continue to be prescribed for indications more clearly definable. It is useless, however, to expect that the addition of vitamin A to the diet will either prevent or cure respiratory or other infections in children who eat well.

VITAMIN A DEFICIENCY

As a result of laboratory experiments on animals we have evidently become over-enthusiastic in our reliance on the adding of vitamin A to the diet to prevent respiratory infection. As a result of the clinical trial the subject has been greatly clarified.

In a children's institution, Hess gave cod liver oil, haliver oil, carotene and viosterol to groups of children and showed that none of these diminished the incidence of common colds, pneumonia, skin infections or conjunctivitis and further did not affect the growth of the children. What a

RADIO ADVERTISING

It is remarkable how much of radio advertising has to do with health matters. Charlatans, patent medicines, foods, and cosmetics are advertised to the public with not only misleading but crudely false claims. The present state of affairs gives a black eye to legitimate advertising and it is high time something was done about it.

The Copeland bill which is to be submitted to Congress proposes to correct this abuse. It is an extension of the field of the Food and Drug Act of 1906 whereby manufacturers were required to truthfully label their wares and pro-

hibited from making false and fraudulent claims on patent medicine labels. There is practically universal agreement that this is a valuable law. The Copeland Bill is to extend these requirements to advertising. Advertising of food, drugs and cosmetics shall not be untrue or even misleading in any particular. Trade puffing is still to be allowed as it is felt such language is usually obvious. Drugs further are to be labeled with directions for use which will not endanger health. Perfectly right. Lash-Lure tragedies should be prevented if possible. Labels are to reveal the contents of the package. Even self-medicators are entitled to know what they are taking. A physician insists on knowing what he prescribes. Rightly, the advertiser, not the radio station or newspaper, is to be held responsible.

The objection raised to the Copeland Bill that medical opinion on drugs or remedies is not in agreement applies more to new remedies than to the majority. The secretary of agriculture who will have administrative powers can obtain reliable information on the value of remedies by a questionnaire to reputable physicians, the present method, or by consulting the national headquarters of the profession.

We would like to see a reform in advertising. If we must listen to it over the radio may we be spared the false statements which nauseate.

A letter was recently received by the Hennepin County Tuberculosis Association from Dr. Kendall Emerson, Managing Director of the National Tuberculosis Association, expressing his hearty approval of the campaign recently instituted in Minneapolis aimed at the early detection of cases of tuberculosis. A syringe and tuberculin, with instructions for the application and reading of the Mantoux test, have been recently sent to Minneapolis physicians by the Hennepin County Tuberculosis Association.

COMPULSORY SICKNESS INSURANCE

"Such experience of life as I have had, together with my reading of the experience of others in this sphere, suggests that *we have made a mistake here*. It suggests, further, that *the mistake has been owing to an imperfect attention to the habits and psychological reactions of a significant proportion of working-class families*. What proportion such families as those I am thinking of bear to the whole I do not know—it may easily be as large as one-fifth or a quarter. *They consist of persons who have very little sense of property and who happily have no desire to possess or accumulate it*. They are not necessarily bad or unattractive persons on that account; nor, except at times, are they properly speaking poor. They very likely live in what is described as a poor home, because as a rule there is not much room and very little furniture; but often, and certainly in good times, a surprising amount of money comes into the house each week. *What they have they spend, sometimes on superabundant but often ill-chosen sustenance, almost universally on the more popular forms of enjoyment and entertainment*. When times are bad they look for all sorts of wind-

falls and use all sorts of shifts and stratagems to secure what is needed at the moment. There is no advantage in including such people in an insurance scheme. They are constitutionally unable to appreciate its meaning. They will resent or fail to pay their contributions. They will honestly regard such cash benefits as the scheme provides for as things to be exploited and by some means or other to be secured when need arises and other resources fail. For them the appropriate means of relieving destitution (not of providing medical attention be it noted—that comes in the other category) is not an insurance scheme but a sympathetically administered Poor Law.

"For the bulk of wage-earners, for that great majority who have a reasonable sense of property and who see the need for thrift, even if some of them cannot understand the niceties of insurance, an insurance scheme to secure cash payments in appropriate circumstances is a most valuable thing. Experience shows that when it is offered advantage will be taken of it. I suggest that while there should be a national scheme for insurance for cash benefits, while there should be extensive propaganda and abundant facilities for such insurance, and within limits governmental contribution towards it, any scheme for these purposes should be on a voluntary basis. It would supply the felt need; no doubt by education and example it would gradually extend its field of recruitment; but it would avoid the difficulties and abuses which most of us have experienced as arising when the opportunity for cash payments is compulsorily extended to those whose ingrained habits and modes of thought prevent them from appreciating the conditions with which those opportunities are surrounded. *I doubt, indeed, whether it will be possible for the nation to continue much longer upon the present lines*."

EDITOR'S NOTE: The above quoted in the November 1933 *A. M. A. Bulletin* was taken from an article by Sir Henry Brackenbury in the *British Medical Journal*, July 15, 1933. It well expresses the psychological reaction of an appreciable portion of the population in any country to compulsory sickness insurance. Instead of the insurance being a matter of thrift, that portion of the population will demand and get all it can from the government and avoid contributing whenever possible. There are those who think that the present government emergency relief measures are laying a foundation for the expectation, on the part of this same element in our population, of government assistance and medical care as their right permanently.

OBITUARY

Dr. Hartland Cyrus Johnson

Dr. Hartland Cyrus Johnson, prominent Saint Paul physician and surgeon, died Sunday morning, November 26, 1933, after an illness of several months. He was born in New York state in October, 1860.

During his earlier years, Dr. Johnson lived near Northfield, Minn., where he attended school. He was graduated from the College of Physicians and Surgeons of Chicago in 1886, following which he practiced in Farmington several years. He came to Saint Paul in 1888 and practiced here until two years ago, when he retired.

Dr. Johnson was a member of the Ramsey County Medical Society, the Town and Country Club, and Saint Clement's Episcopal Church. He was a Mason and a Shriner.

Survivors are a daughter, Mrs. Harry Oerting, a brother, Dr. Asa M. Johnson; and a granddaughter, Dorothy Marie Oerting, all of Saint Paul.

A FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

Federal Emergency Medical Relief

Shall the Government Pay the Doctor?

What is the attitude of the medical profession in general on the subject of Federal Emergency Medical Relief?

No doubt, there is genuine apprehension in some quarters of its possible influence on medical practice of the future.

Everywhere, representatives of organized medicine have proceeded guardedly in making arrangements for the operation of this relief.

The greatest danger to be guarded against, in their opinion, has seemed to be any official sanction for a fee schedule which has been reduced only for emergency care of the indigent.

Accordingly, in Texas, the state society approved no fee schedule at all but arranged for each county society to make its own contract with the state welfare agencies acting as federal administrators of relief.

In Michigan, the state society has suggested a fee schedule, following the lead of Minnesota as to basic rates and reductions, with the specific request to federal authorities, there, that the schedule be kept confidential.

In Minnesota, negotiations with the State Board of Control have been carried on by a group of individuals which included officers of the state society but which was not in any sense an official committee from the society. The suggested fee schedule, with the reduction of 40 per cent arrived at as a result of these negotiations, is therefore in no sense binding upon the membership of the society and each physician is still free to negotiate his own terms with his local representative of the relief administration.

In the three cases cited, no official, standardized fee schedule has been publicly sanctioned by state organizations. In two cases, whose example will probably be followed in many other states, reduction has been made in part by a flat percentage from a basic fee as more desirable than any further explicit reduction of the fee, itself.

The rules and regulations for administration of medical relief as distributed by the Federal Relief Administration are careful to stipulate that there shall be no disturbance of the physician and patient relationship and no control, save the control involved in setting tentative limits to the amount of service to be given without special authorization, is to be exercised over the doctor.

The fact that federal relief funds are now for the first time available to pay the physician's bill along with the grocer's, the coal man's, and the landlord's bill, is obviously gratifying to the profession. This recognition of the right of the physician to remuneration has been long overdue.

The fact that there are people who need immediate emergency medical care and cannot get it, is also obvious and a fact to be faced by the profession. The load has got far beyond what the profession, with the best will in the world, but with credit and charity lists stretched already to the utmost, can carry.

In view of this situation, there seems very little doubt that the vast majority of physicians will accept compensation at the hands of the government for relief cases. Many of them regard it as imperative. The present situation is an emergency which they must meet just as they would meet a war time emergency and without too much regard for problematical consequences at some future time. At any rate requests for information made to the state office indicate a widespread interest in the matter.

For the sake of these inquirers it should be emphasized again, probably, that only those who are already on the relief rolls, and only in counties now receiving federal relief funds, are eligible for this federally financed emergency medical care. The list of those counties, with the names of county relief workers with whom the names of physicians desiring to engage in this type of care must be registered, follows:

Aitkin—Mr. L. Fiske, Aitkin.

Anoka—Miss L. I. Berger, 3977 Van Buren St. N.E., Minneapolis, Minn.

Beltrami—Mr. Ray Carney, Bemidji.

Becker—Mr. Claude Lindquist, Detroit Lakes.

Benton—Miss Mary Starr, Sauk Rapids.

Big Stone—Mrs. Hazel Decker, Ortonville.

Carlton—Miss Margaret Atkinson, Carlton.

Cass—Mr. Glen Holstad, Walker.

Chippewa—Miss Esther Freeman, Montevideo.

Clearwater—Mr. W. Beard, Bagley.

Cook—Miss Ruth C. Ferguson, Two Harbors.

Crow Wing—Miss Mildred Hagstrom, Crosby.

Hubbard—Mr. Maurice Warble, Park Rapids.

Isanti—Miss Laddie McNamara, Cambridge.

Itasca—Mr. R. W. Gifford, Grand Rapids.

Kanabec—Mrs. Mabel Ravenscraft, Ogilvie.

Kittson—Mrs. John Brendal, Hallock.

Koochiching—Miss Ellen M. Saarela, International Falls.

Lake—Miss Ruth C. Ferguson, Two Harbors.

Lake of the Woods—Miss Hilfred Johnson, Baudette.

Mahnomen—Mrs. Otto Isaacson, Mahnomen.

Marshall—Mr. Stephen S. Easter, Warren.

Mille Lacs—Miss Lyle Byrnes, Milaca.

Minneapolis (City)—Mr. M. U. G. Kjorlaug, Division of Public Relief, Court House, Minneapolis.

Norman—Mrs. Eleanor Bue, Ada.

Ottertail—W. I. Prince, Fergus Falls.

Pine—Miss Julia Zupanich, Pine City.

Roseau—Mr. C. S. Rondestvedt, Roseau.

St. Louis Park (City)—Mrs. E. H. Renner, City Worker, 5806 Goodrich Ave., St. Louis Park, Minn.

Staples—Mr. B. C. Barrett, Staples.

Stearns—Mrs. Emma Moynihan, Court House, St. Cloud.

Traverse—Miss Elizabeth Burns, Wheaton.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MEDICAL BROADCAST FOR THE MONTH The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 11:15 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of January will be as follows:

January 3—What Price Health?

January 10—Little's Disease.

January 17—First Aid in Poisoning.

January 24—Mental Health in Childhood.

January 31—Jaw Tumors.

THE STATE MEETING

Several exhibits of especial interest are planned for the 81st Annual Meeting of the Minnesota State Medical Association, to be held at Duluth, July 16, 17, and 18, 1934.

One is the prize winning pneumonitis exhibit prepared by John W. Towey, superintendent of the Pinecrest Sanatorium, Powers, Michigan, awarded the medal at the Milwaukee meeting of the American Medical Association. The exhibit is of especial interest and significance to the medical profession in Minnesota inasmuch as it includes the Minnesota hardwoods that have been found to affect workers, here, also complete x-ray films. Dr. Towey has consented to present a paper on pneumonitis, according to the Committee on Scientific Assembly, now engaged in shaping the program for the three-day Duluth session.

The Diabetes Committee of the State Society, under the chairmanship of Russell M. Wilder, Rochester, will sponsor another exhibit of unusual practical value at this meeting. Several sessions for small groups will be held each day in connection with this exhibit. Talks will be given these small groups, together with special instruction in the administration of insulin and in planning special diets. It is proposed that the series take the form of a postgraduate course in diabetes.

Arrangements are practically complete, the Committee reports also, for a notable cancer exhibit with special demonstration of various new diagnostic methods including transillumination of the breast and the Schiller test.

Another exhibit of especial current interest will show the effects of certain harmful cosmetics, particularly those used for dyeing eyelashes and eyebrows, which have received so much medical attention of late. Arthur J. Cramp, Director of the Bureau of Investigation of the American Medical Association, who prepared the exhibit, will be present himself to talk at the meeting on this subject.

A heart exhibit and demonstration and an interesting symposium on endocrines are to be further features of the meeting.

A program constructed on lines similar to those of the Rochester meeting is being developed, the Committee announces. Considerable time will be devoted again this year to the very successful small group demonstrations that featured both the Saint Paul and Rochester meetings.

There will be separate medical and surgical lecture

sessions, many of them under the direction of the special societies and amplified by dry clinics.

It is announced that program time is still available for a few good scientific moving pictures. Anyone who has such pictures should communicate immediately with committee members or with the State Office, 11 West Summit Avenue, Saint Paul.

CAMP RELEASE DISTRICT MEDICAL SOCIETY

Drs. R. K. Ghormley, A. R. Barnes and P. A. O'Leary of Rochester, were the speakers at the annual meeting of the Camp Release District Medical Society, held at Granite Falls, November 16. Dr. Ghormley talked on "Common Fractures," Dr. Barnes on "Coronary Disease" and Dr. O'Leary on "Dermatosis of the Palms." The following officers were elected for the coming year: President, Dr. L. J. Holmberg, Canby; vice president, Dr. M. S. Nelson, Granite Falls; secretary-treasurer, Dr. J. Dordal, Sacred Heart.

WOMAN'S AUXILIARY

President—MRS. A. A. PASSER, Olivia
Chairman Press and Publicity—MRS. GLEN R. MATCHAN,
Minneapolis
Editor—MRS. S. H. BAXTER, Minneapolis

The Women's Auxiliary is pleased to announce that the State President, Mrs. A. A. Passer, is convalescing after an operation and will soon be back at work.

The Women's Auxiliary to the Ramsey County Medical Society opened its year's activities in October with a largely attended tea at the home of Mrs. Arnold Schwyzer. Mrs. John J. Ryan, newly elected president, named the following chairmen of standing committees: Mrs. E. H. Boland, Philanthropy; Mrs. E. V. Goltz, Program; Mrs. W. A. Kennedy, Hospitality; Mrs. Harry B. Zimmermann, Membership; Mrs. A. G. Schulze, Ways and Means; Mrs. L. W. Barry, Publicity; Mrs. C. C. Bell, Telephone; Mrs. Edward Schons, Legislative; Mrs. F. H. Neher, Year Book. Mrs. Harry B. Zimmermann is president-elect; Mrs. Leo Hilger, first vice president; Mrs. Harry Oerting, second vice president; Mrs. Harry Ghent, recording secretary; Mrs. P. Roy, corresponding secretary; Mrs. D. K. Bacon, treasurer, and Mrs. Asa Johnson, auditor.

At this meeting it was voted to donate a loving cup which is to be awarded to the winner in Ramsey County in an essay contest on the subject of "Youth, the Hope in Tuberculosis Control." This contest, which is state-wide among the junior high and senior high school students, will be sponsored by the Minnesota Public Health Association.

The November meeting was held at the home of Mrs. W. C. Rutherford. A lovely musical program was given by local artists, followed by tea. Mrs. W. H. Von der Weyer, who was placed in charge of securing Red Cross memberships in the Lowry Medical Arts Building, reported having secured more than her quota.

The sale of Christmas seals in Saint Paul for the first day, December 4, was in charge of Mrs. Harry Ghent and Mrs. Leo Hilger.

On December 5, the Ways and Means Committee, under the direction of Mrs. Albert G. Schulze, sponsored a Baked Ham dinner, given in the Ramsey County Medical Society Assembly Room, Lowry Medical Arts Building. The proceeds of this dinner will be used to replenish the philanthropic fund.

(Mrs. L. W.) MAY BARRY,
Chairman Publicity.

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of November 8, 1933.

The regular monthly meeting of the Minnesota Academy of Medicine was held on Wednesday evening, November 8, 1933, at the Town and Country Club. Dinner was served at 7 o'clock. The meeting was called to order at 8 o'clock by the President, Dr. C. D. Freeman. There were sixty-five members and one guest present.

Minutes of the October meeting were read and approved.

Dr. George D. Head, chairman of the Necrology Committee, read the following Memorial to Dr. John W. Bell, a charter member and former president of the Academy.

JOHN WESLEY BELL, M.D., 1853-1933

The Minnesota Academy of Medicine is again called upon to mourn the passing on of one of its oldest and most revered members, Dr. John Wesley Bell. This pioneer physician of the state was born March 18, 1853, in London, Ohio, the son of Robert J. and Ann Bell. His father was a farmer and his early education was carried on in the public school system of that state. In 1876 he received his medical degree from the Ohio Medical College, following which he pursued postgraduate work in London and in Germany.

Six years later he settled in Minneapolis where he began a career of more than fifty years in the practice of our profession. In 1886 he was elected Professor of the Theory and Practice of Medicine at the Minnesota Hospital College and two years later he was made Professor of Physical Diagnosis and Clinical Medicine at the Medical School of the University of Minnesota and served a period of twenty-eight years in active teaching. He was elected to the Minnesota State Senate from 1891 to 1895. He was appointed a member of the Minneapolis Charter Commission. When the Hennepin County Tuberculosis Sanatorium was established he was chosen a member of its commission and served until his resignation in the year 1919.

During his long medical career he received many honors. He was President of the Hennepin County Medical Society in 1902 and of the Minnesota State Medical Association in 1905. He was a Charter Member of this Academy and was elected its President in 1894. He was a member of the American Gastro-Enterological Association, and was elected an Honorary Member of the Minnesota Society of Internal Medicine.

He was married November 11, 1890, to Kate M. Jones, who, with two sons, Dr. Warren Bell and Robert Bell, survive him. He died May 16, 1933.

These, in brief, are the recorded facts in his long and useful life. But it is not the recorded achievements of life which build enduring memories. A man of quiet personality, unusually modest, considerate of his fellow practitioners to a remarkable degree, beloved by his patients, his memory will live in the hearts of those who have known him long after the deeds of more aggressive men have been forgotten. There are important achievements in his useful life which demand specific notice: his career as a member of our profession and as a consultant, his services in medical education, and his contribution to the literature of his day. It is of these outstanding landmarks that we wish to speak.

Never a robust individual, Dr. Bell carried on a very active practice in medicine over many years. Unremitting in his labors, out early each day, he was strict in keeping his appointments and he made it a matter of professional honor always to be at his consultations on time. Many of those who had been his former

pupils looked to him as their consultant and modeled their ways after his.

With unusual clinical powers of observation, an accurate diagnostician, he had a genuine sympathy for his patients and he maintained in his relations with them the highest ideals of courtesy and kindness. His whole life was given over to the interests of medicine. He had other activities but they were of relatively minor importance. At his death, he left behind him countless friends among the rich and poor.

As a member of the original Faculty of the School of Medicine of the University of Minnesota, Dr. Bell is mentioned in the minutes of the Board of Regents' meeting in 1888. He served as Professor of Physical Diagnosis and Diseases of the Chest from 1891 to May 1905, at which time he was made Emeritus Professor of Physical Diagnosis and Clinical Medicine and served as such to the date of his death. His addresses to the Senior students of the Medical School upon medical ethics and medical economics were given subsequent to his retirement from active teaching. As late as one year ago Dr. Bell gave one of these lectures upon Medical Ethics full of practical advice and sound counsel to young practitioners.

It is impossible to estimate the profound influence of this man's lectures upon the young men entering the profession, and Dr. Bell was, both by precept and example, the "Admirable Crichton" of medicine. We, who were at first his students and later his conferees, can only now honor him by striving to reach the heights he so often exhorted us to work toward. Truly, there is a "lonesome place left against the sky" since John Bell died.

His contributions to medical literature are comprised in eighteen bibliographic records which we have been able to find and which we wish to record.

BIBLIOGRAPHY OF THE WRITINGS OF DR. JOHN WESLEY BELL (1853-1933)

Compiled October 16, 1933

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The subjects treated are varied, five are devoted to the heart and its diseases, three to pulmonary tubercu-

losis, three to gastric diseases (cancer and ulcer), and three upon such general topics as medical ethics and medical economics, rational therapeutics, etc. Quotations from some of these writings reveal the character of the man.

In a paper upon "The Early Manifestations of Pulmonary Tuberculosis," he writes: "Pulmonary tuberculosis is emphatically a disease of all times, all countries and all races. No climate, no latitude, no occupation, no combination of favoring circumstances affords perfect immunity. It invades alike the homes of the rich where every comfort abounds and the abodes of the poor where the misery of a hopeless disease is rendered more miserable by the pangs of poverty and neglect."

In a paper on the senile heart he says: "I desire to emphasize first the necessity, yea the obligation, for early and prompt recognition of the danger signals indicative of beginning senile cardiac insufficiency, believing that no practitioner is justified in ignoring or passing as unworthy of the therapeutic attention the breathlessness, precordial distress, and irregularity of the pulse, so often encountered after middle life."

In his presidential address before the State society in 1905, "A Need for More Rational Therapy," he says: "As physicians we should remember that in the eyes of the people treatment is everything, the Alpha and Omega of Medicine." "As a profession we have directed all our efforts and energy to the investigation, detection and prevention of disease, leaving the individual ill with disease to take care of himself." "I know of no man in or out of our ranks so positively harmful and detrimental to the progress of medicine as the therapeutic nihilist."

In his address on medical economics delivered to the Senior class of medicine in 1928, we read: "A professional life may be likened to a road or highway and success its destination. He who keeps on the highway and follows the road signs usually avoids the bumps and saves worry and expense." "Medicine has for its prime object the service it can render humanity but the physician must live in order to render the service." "A physician is a public personage and should manifest an interest in the community."

In his lecture on Medical Ethics, delivered at the Medical School in 1927, we get many sidelights upon Dr. Geist's character. To quote from the lectures: "It is well to remember that more men fail in the practice of medicine from the inability to understand and manage people than from ignorance of the science of medicine, colossal as the latter may be at times." "The future of medicine rests with the students of today." "The physician's life is a strenuous one but its rewards are many and within the reach of all who sincerely seek to serve humanity." "The ability to inspire confidence, natural to some, is a most valuable aid to a physician." Sympathy more than any other quality wins the hearts and confidence of patient and relatives." "The physician should remember that scandal is like an egg—when it is hatched it has wings." "He should remember that the poor are his first and most loyal patients." "No individual carries greater responsibilities to the generation in which he lives or the community in which he practices than the physician." And finally he pronounces his own benediction in these words: "And when life's day is spent and evening is announced by the inelastic step, the dimmed vision, the impaired memory and the hardened arteries, the frail old man returns to his friend of the morning to be relieved and comforted until his eyes are closed in the eternal sleep."

And now we have turned the leaves in his book of life; the last page has been read. We close the volume. Stimulated by his achievements, his wisdom and his

faith and example, we fix our eyes upon the future of our beloved profession with hope and courage.

The Committee:

ARTHUR S. HAMILTON,
JOHN E. HYNES,
GEO. DOUGLAS HEAD, *Chairman*

Dr. E. L. Gardner, Chairman of the Necrology Committee, read the following Memorial to Dr. Emil S. Geist, a past president of the Academy.

EMIL S. GEIST, M.D., 1878-1933

Dr. Emil Geist was born in Saint Paul, Minnesota, on May 9, 1878. Following his graduation from the Medical School of the University of Minnesota in 1900, he served one year as an intern at St. Joseph's Hospital in St. Paul and then spent three years doing postgraduate work in Paris, Breslau and Vienna. In Breslau he was associated with the noted surgeon, Mikulicz, at a time when Sauerbruch was associated with the clinic and in Vienna he studied and formed a lasting friendship with Dr. Adolph Lorenz. Upon his return home he entered the practice of orthopedic surgery in Minneapolis, where he was active until his death.

In 1911 he married Miss Augusta Ohage, daughter of Dr. Justus Ohage of St. Paul.

Dr. Geist served as Major in the Medical Corps of the United States Army during the World War, and conducted schools of orthopedic surgery at Fort Oglethorpe, Georgia, and Fort Sam Houston, Texas.

His name will best be remembered for his contributions to Orthopedic Surgery. He was the founder and "Father" of the Minnesota Orthopedic Society, and served as a teacher of orthopedic surgery at the Medical School of the University for many years. He was head of the orthopedic department of the Minneapolis General Hospital for many years, and was on the active staff of all the private hospitals in Minneapolis. He was a very active member of the American Orthopedic Association and he became a charter member of the International Society of Orthopedic Surgery founded in Paris in 1930. His contributions to medical journals were many and important. He was particularly interested in the progress of his specialty and rarely failed to attend the meetings of any important orthopedic society in America or abroad.

He was an active member of the American Medical Association, the American College of Surgeons, the Minnesota State Medical Association, the Hennepin County Medical Society, the Minnesota Pathological Society and the Minnesota Academy of Medicine. In 1928 he served as president of the Hennepin County Medical Society and in 1930 the Minnesota Academy elected him its presiding officer. He was a member of Alpha Kappa Kappa Medical Fraternity and of the Minneapolis Club.

Dr. Geist had an unusually active mind not only in medicine but also in music, art, literature, languages and outdoor life. His main diversion was to invite various members of the Minneapolis Symphony Orchestra to his home for evening dinner and then spend several hours playing chamber music during which he played a score for the violin. His speaking knowledge of European languages broadened his acquaintance and developed a real cosmopolitan viewpoint. Dr. Geist was in unusual demand for holding clinics, not only for his masterly presentations but also because of his genial, whole-hearted nature which made friends in all his contacts. No one ever gave more time to unfortunate physicians and their families or to the poor who could not pay a fee. He never thought of saving himself until he suffered his first coronary attack about five years before his death. To his great credit he was able to adjust his habits and his mental viewpoint in spite of the knowledge his end might come at any time. He on

several occasions had stated that each added year was a gift of fate and that he was enjoying and making the most of each day as it came, without fear of the end.

Death came suddenly on May 14, 1933, at his home a few hours after he returned from a meeting of the American Orthopedic Association in Washington. He is survived by his wife, one son, Justus John, and two daughters, Annamarie and Louise.

The Minnesota Academy of Medicine mourns not only the loss of a loyal member, but also the contact with a whole-hearted stimulating personality.

The Committee:

GUSTAV SCHWYZER,
WALLACE COLE,
E. L. GARDNER, *Chairman*

THE EYE IN CARDIOVASCULAR DISEASE

ARTHUR EDWARD SMITH, M.D.
Minneapolis

ABSTRACT OF INAUGURAL THESIS

Increased incidence of cardiovascular disease in past three decades. Due to greater prevalence of cases of coronary sclerosis-hypertension group.

Reasons for characteristic reaction of the eye tissue to the effects of disease of the heart and blood vessels. Unique opportunities for observation of the presence and progress of vascular pathology in the fundus of the eye.

Classification of diseases of the heart and blood vessels affecting the eye.

Significance of pulsation of the retinal vessels.

Etiology and essential nature of hypertension, with description of fundus changes observed in the various forms of hyperpiesis including the hypertensive toxemia of pregnancy.

"Albuminuric retinitis"—an obsolete and misleading term, since albuminuria has no bearing upon the condition, which is a degenerative rather than an inflammatory process. In retinopathy associated with kidney disease hypertension is the underlying factor which is primary responsible for both the nephritis and the retinal lesions.

Types of kidney disease associated with retinal pathology.

Prognostic significance of hypertensive neuro-retinopathy. Pathologic anatomy of the eye in hyperpiesis.

Arteriosclerotic retinopathy—may exist as a distinct entity or be associated with hypertension. Characteristic fundus picture. Advanced arteriosclerotic changes in the fundus (especially in senile arteriosclerosis) often seen in the presence of normal visual acuity. Pathologic anatomy of arteriosclerotic retinopathy.

Difficulties encountered in the study of the micro-effects of the various dyscrasias and diseases of the blood affecting the integrity of the capillary walls, with resultant hemorrhage, etc.

Difficulties encountered in the study of the microscopic pathology of the eye. Scarcity of material for examination. Most enucleated eyes are the seat of advanced pathological changes and there are few opportunities for making microscopic examinations of eyes in the earlier stages of disease.

In the future, probably most of the advancement of our knowledge in regard to the eye pathology in cardiovascular disease will be achieved through improved methods of clinical examination with the slit lamp, the newer types of magnifying ophthalmoscopes, employment of short-wave-length light, etc.

SOME EXPERIENCES IN SURGERY OF THE COLON

A. R. COLVIN, M.D.
Saint Paul

DISCUSSION

DR. A. E. WILCOX (Minneapolis): Dr. Colvin has presented this paper in his usual interesting and instructive manner. Regarding the diagnosis in acute conditions of the colon, I presume we will always have more or less of the same difficulty; and these difficulties he has emphasized in his remarks and recital of the case histories. After the pathology is definitely established upon exploration, an analysis of what appeared to be trivial symptoms often becomes illuminating.

Carcinoma so seldom gives any suggestive symptoms, particularly of obstruction, until the impaired lumen of the bowel suddenly becomes blocked by some fecal impaction or fruit seeds, that no complaint is made by the patient and surgical contact is delayed until these acute abdominal conditions arise.

What I wish to emphasize particularly in the consideration of Dr. Colvin's paper is the preoperative preparation of the patient. The nasal suction apparatus as devised by Dr. Owen Wangensteen is an admirable means of decompressing the abdomen and getting these cases of obstruction in condition for operative procedure. This method has been presented before this Academy and elsewhere by Dr. Wangensteen. We have, since he familiarized us with this apparatus, been much impressed by its usefulness and efficiency in cases of obstruction and have obtained results which we believe make it preferable to cecostomy. I cannot speak too highly of this preoperative preparation of the patient by the nasal suction method.

DR. H. B. SWEETSER (Minneapolis): I wish to compliment Dr. Colvin on his exhaustive and very instructive paper on diseases of the colon and their treatment. In his report of a case of cancer of the sigmoid he stated that he resected the tumor and reunited the intestinal tube, but that a year afterwards there was a recurrence with numerous metastases. It occurs to me that in our effort to make the postoperative life of our patients not too uncomfortable and inconvenient, we are liable to be too conservative in our surgical attack.

In this connection I would like to report a case I operated in November, 1932, one year ago. The patient had an acute intestinal obstruction due to a carcinoma of the sigmoid, low down. I resected the sigmoid, from about six inches above the anus to six inches above the tumor, and implanted the proximal end into the skin, through the split fibers of the rectus muscle as an artificial anus. This man is so far perfectly well and at work daily. His bowels move daily in the morning before he goes to business; he is not troubled with expulsion of flatus, and there is practically no (or little) soiling of his bandage with fecal discharge.

I would like to ask Dr. Wilcox if he depends entirely on the nasal suction to relieve the intestinal distention without a subsequent colostomy, and if it always succeeds.

DR. A. E. BENJAMIN (Minneapolis): I want to congratulate Dr. Colvin on his paper; there is much food for thought in it. If one examines all these patients beyond 50 years of age by means of x-rays of the colon, I think he will find a large percentage of them will have diverticula. We know that diverticula can occur anywhere from the esophagus down to the anus. Many fistulae and sinuses from a diverticulitis in the anus occur in these cases. If you will take these x-rays you will not advocate these large enemata with diverticula. I believe many people do themselves much harm by taking large enemata. If these patients use oil enemata and are put on liquid or semi-solid diets, some of them

will improve. I have a number of patients with diverticula of the colon at the present time who are feeling better. Very few of them will require operation excepting the untreated ones may develop acute attacks. Of course, some of these will have to be operated. It is difficult to cure and many patients develop obstructions. To make a diagnosis between diverticulitis and appendicitis occasionally is rather difficult.

I think a primary colostomy should be done in nearly all of these cases where there is complete obstruction. I have used the nasal suction, as Dr. Wilcox mentioned, before and after operation. After a carcinoma is removed and an anastomosis is performed, it is best that a small opening be left at the site of the colostomy. I do it in such a way that a small vent is left in the bowel for the leaking of gas from the bowel for weeks afterwards. This relieves the patients of gas distention and suture tension and prevents a blow-out. I think this is a very interesting subject.

DR. GUSTAV SCHWYZER (Minneapolis): I would like to mention a patient whom I operated upon seven years ago next January. She was 30 years old at that time. I operated upon her first for an intestinal trouble that looked like appendicitis. There was no blood in the stool, very slight tenderness of the abdomen, but this slight painfulness more on the right hand side. The bowel movements were normal. Seven months later she came to the office during my absence and my associates found her to have a large tumor in the abdomen, slightly movable, and not markedly painful to touch. As no symptoms of obstruction were existing, the pos-

sibility of a foreign body was thought of. On my return in the fall I found, on my examination of the patient, a well-demarcated, large tumor, of irregular form, in the region of the navel. The hemoglobin was reduced to 38 per cent. I excluded the possibility of a foreign body on account of now discovering blood in the stool. It became probable that we had to do with malignancy. Repeated gastro-intestinal x-ray examinations finally brought out a marked defect in the transverse colon, which findings confirmed our diagnosis. After giving the patient 600 c.c. of citrated blood that brought the hemoglobin up to 44 per cent, we incised the abdomen, this time in the mid-line, and found a large carcinoma of the transverse colon, 12 cm. long and 5 cm. thick. I made an end-to-end anastomosis after resecting the cancer of the transverse colon, reuniting the two ends without any tension, because the splenic and hepatic flexura coli were freed, according to Moynihan. The patient left the hospital in two weeks. She never vomited after the operation and is comfortable today.

I want to mention this case for the reason that it is rare to find such large adenocarcinoma of the transverse colon in a young person. Dr. Benjamin made the statement that the colostomy would be the safest procedure and should be done first. I think his thought is correct in all cases of obstruction, but the ideal way is the one-stage operation with an end-to-end anastomosis if conditions present themselves feasible for this method.

R. T. LAVAKE, M.D., *Secretary.*

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CANCER*

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New York City

IT IS well, before starting on any discussion of cancer, to ask the question, "What is cancer?"

There is a very general theory, rather popular with the medical profession and universal with the laity, that cancer is a disease comparable to syphilis or tuberculosis, differing from them, however, in always proving fatal, calling for early diagnosis and immediate surgical excision, characterized by malignant, progressive growth, always essentially the same disease, and probably always of parasitic origin.

I believe this theory about cancer is erroneous. Furthermore, it is one of the most serious obstacles in the way of progress in the knowledge and control of the disease. Cancer is not a single disease comparable to syphilis or tuberculosis, but it is a great group of diseases, very varied in causation, course, indications for treatment and prognosis. It is the object of my remarks this morning to offer data in support of this view.

Many years ago a famous pathologist, Rudolf Virchow, was asked this very simple question which so many of us are so ready to answer today, "What is cancer?" He replied that no one, even under torture, could say exactly what cancer is. He had a rather philosophical view about it. Virchow divided all biological processes into three grand classes: (1) normal growth and functional changes, which we cover by the substantial sciences of anatomy, embryology and physiology; (2) inflammation, which is reaction to injury, and covers the infectious and degenerative diseases; (3) neoplasia. He thus placed

the group of tumors as of equal importance to the other two grand classes of biological processes, and indicated that the term "cancer" is not specific, referring to a single disease, but generic, referring to a whole group.

The progress of our knowledge in the last sixty years, since Virchow made that generalization, has supported his views.

The most important evidence on the question whether cancer is a specific, clinical, pathological entity, is its causation. When we look over the known causes of cancer, we find they are very varied.

I remember many years ago, in 1902, when Jensen presented his evidence that cancer in rats could be transplanted from one rat to the other, the old pathologists, or rather the young pathologists in those days, were indignant that one should break down the well known barrier, because up to that time no one had succeeded in transplanting cancer. We took refuge in the statement, "Well, we have transplanted cancer but no one has yet succeeded in producing cancer experimentally."

Today there are many ways of producing cancer experimentally. The first of these was unwittingly demonstrated by the pioneers in radiology who inadvertently exposed their hands to unfiltered soft rays, and in a very high proportion of cases they developed cancer, after a long period of peculiar precancerous changes. Here was a specific cause of a specific type of cancer, differing from every other type of cancer, unaccompanied by much overgrowth of cells, characterized especially by very sharp and definite, atypical qualities of the cells, with marked infiltrative tendency, and a uniformly fatal course.

*Citizens Aid Society Memorial Address presented at the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 24, 1933.

There is no other type of cancer that has the same causation or the same clinical course.

Recently, radium has taken its place as an effective exciting factor in cancer, much the same as x-ray. In those dial painters who poisoned themselves by swallowing small amounts of radium in dial painting, we have cases of osteogenic sarcoma, where the radium lodged in the bones and, by the continuous action of small amounts of radium through the alpha rays, produced, in a high proportion of cases, osteogenic sarcoma. That has been produced experimentally in rabbits.

Recently we have come to recognize in tar and its derivatives a highly cancerigenic agent. The work of the London Cancer Hospital shows the high distillation products of tar, especially dibenzanthracene, produces cancer in animals in a comparatively short time, with a specific course. Dibenzanthracene is the most active cancerigenic agent we know, and it is entirely different in its action from the x-ray.

Throughout the list of simple chemicals, the alkalis and the acids are active in producing cancer. Recently there comes from Russia a report that Michaelofsky was able to produce cancer of the testis by injecting small amounts of chlorid of zinc into the testes of cocks. He was successful only during the breeding season. We have subjected this remarkable result to investigation in our laboratory. Only the other day we found several enormous teratomatous carcinomas of the testis in these cocks, some of them almost as large as the rest of the animal, undoubtedly due to the specific effect of chlorid of zinc, which has nothing to do, as far as we know, with x-ray and nothing to do with tar.

So there are a number of chemical agents, quite specific in themselves, which are capable of producing cancer in a high proportion of cases and in a comparatively short period.

When we look over the causation of the major forms of cancer, we find that the character of the irritant which we believe is active in most instances is very varied and, in most cases, still escapes us. We know about the effects of tobacco and bad teeth producing intraoral cancer, and there is a very good reason for believing that mammary cancer is very often the result of the irritation of lactic acid in stagnating milk.

There is little doubt that cancer of the stomach is largely the result of abuse of the organ, and

probably connected with infections of the mouth; so, also, esophageal cancer.

Sunlight produces a characteristic type of epidermoid carcinoma of the lip. We get quite a few of these cases in the South, especially among the fishermen. There is a distinct history of exposure to sharp sunlight. It is a very peculiar type of cancer.

I won't take any more time in reviewing the causes of the known forms of cancer but believe that the instances cited are sufficient to show that many different forms of cancer are the direct result, under proper predisposing conditions, no doubt, of specific irritants, and that on the point of causation we have every reason to believe these are specific diseases.

I have no doubt that observant and intelligent clinicians in the future (and I trust in the near future) will devote their attention to a more careful study of the conditions of origin of the different major forms of cancer and thus enlarge our knowledge in a practical direction in this field.

You may say, while the causes of cancer may be very varied, nevertheless the process, when once excited, is always the same. No doubt this statement will meet with considerable approval among experienced physicians and surgeons. It was very vigorously put up to me the other day by an experimental pathologist with whom I was pursuing this particular argument. He said, "Yes, the causes are all very different, but the process is always the same when once excited."

On investigation, this statement does not prove to be correct. What would you regard as the most fundamental property of the cancer process which would indicate whether or not it is always the same? Probably the metabolism of the cancer cells. How do they get their energy? What makes them grow? We don't know a great deal about this, but we have very intimate information on the chemical side through the contributions of Warburg. Warburg found that the cancer cell tested in vitro reveals a loss of oxidative capacity, a failure to respire, and a great increase of glycolytic properties. Low respiration and high glycolysis is a specific feature, and is the greatest contribution ever made by chemistry to the cancer problem.

However, it was very soon found that low respiration and high glycolysis are not limited to cancer tissues. They are found, also, in some

normal tissues, the retina, for instance. They are found in nearly all the granulomas, especially the active ones. It is more or less characteristic of certain embryonic tissues. It is highly characteristic of leukocytes. So that these features are not enjoyed exclusively by the cancer process.

Moreover, there are certain cancers that have been studied in the last two or three years, which do not show low respiration and high glycolysis. For instance, some of the lower animal tumors show normal respiration and low glycolysis.

I might pursue this subject a little further into other phases of the chemical and physical studies of cancer, but this is enough to show that the most fundamental knowledge that we have of the cancer process does not indicate that it is always the same process when once excited. This is quite in accord with the experience of surgeons and physicians who deal with cancer firsthand, because we see some that are very active, extremely malignant and always kill, sometimes within a few weeks, and others are slow, apparently benign, can be tampered with, treated by various conservative measures, the result being generally quite favorable.

All the clinical phenomena surrounding the different forms of cancer, I am sure, to every experienced clinical observer, must appear as very different diseases.

My opponent pursued the matter still further. He said, "Yes, the chemistry may be different on account of different rates of growth," as he claimed, "but the morphology of the process is very similar in all instances, whereas the inflammatory processes which are really different diseases differ enormously."

I spent a good many years in the study of the morphology of cancer. I need not tell those who gather at the Mayo Clinic that the morphology of cancer varies enormously.

Broders pointed out the great differences in the morphology of cancer and their great clinical significance. I think the proper answer to the statement that the morphology of cancer is one and the same, is that most of us old pathologists, who have been more or less specializing in the recognition of cancer, still have great difficulty at times in telling whether a process is cancer or is not cancer. In fact, I may say that the morphology of the cancer process differs more widely than the morphology of inflamma-

tory processes. Therefore, on causation, on metabolism, on morphology and on clinical grounds, we are justified in assuming that cancer is not one disease but a great group of diseases with very wide variations.

The specific character of different cancer processes also becomes much more impressive, when we enter the rather new field of the physiology of tumors. It is not an altogether new field, although its pursuit has been developed to a high degree in the last few years, especially the last decade.

From this study, it appears that cancers are not merely vagrant, malignant cells; they are organs, with very complex relations, affecting the body in a great variety of ways, and with such diverse effects that this type of evidence confirms our notion that cancers are different diseases.

Many years ago, it was shown that metastatic adenocarcinoma of the thyroid, benign, metastasizing thyroid struma, produced iodothylin. Today we know that most of the thyroid tumors, even metastatic, still exert this physiologic function, producing iodothylin.

Osteitis fibrosa cystica, Recklinghausen's disease of bone, is now known to emanate not from local conditions in the bone but from over-activity of the parathyroid gland, which very often shows tumors, which the surgeons recognize and remove, with a cessation of the disease, although local factors may determine the exact point in the bone or bone-marrow where the cysts or giant cell tumors develop. The whole thing is controlled by the hormone secreted by the parathyroid gland.

Recently, much interest surrounds those cases of hyperinsulinism, with insulin shock, in cases of tumors of the islands of Langerhans of the pancreas. These have been identified by Dr. Robertson in this clinic, the tumor removed, and the hyperinsulinism has disappeared.

For some years it has been known, from the Aschheim-Zondek test, that Prolan A, the secretion of the anterior lobe of the hypophysis, is present in the blood in considerable amounts in many malignant tumors, especially in tumors of the sex glands. It is present in teratoma testis, which is a form of pseudogestation in the male. It is present with nearly all the tumors of the ovary. It is particularly interesting in its relation to tumors of the testis.

Ferguson, in our laboratory, is now using the Aschheim-Zondek test, assaying the blood and urine, finding this reaction in cases of teratoma of the testis, in high proportions in those which most resemble chorioma, in smaller proportions in the less malignant tumors and in small proportions in the comparatively benign, slowly growing, adult teratomas. He is able to make a diagnosis of these testicular tumors on these reactions for Prolan A, and to determine in general the histological character of the process. The chorioma is a rapidly growing tumor, producing 40,000 or 50,000 units; the smaller adenomas 5,000 to 10,000, and the solid teratomas about 1,000 to 2,000. He has had much success with quite a series of cases, numbering over 100, in determining not only the presence of tumors as opposed to some other condition, but the actual histological type and the general prognosis of the case. Moreover, the reaction disappears when the tumor is removed, and returns in the urine before any detectable signs of recurrence are observed. The use of this test has become routine. I believe it has extended rather widely in many laboratories. It is found indispensable in following the course of these teratomas of the testis.

The ovarian tumors are no longer classified, or should no longer be classified, solely according to their structure. They never were satisfactorily classified according to structure. They are too numerous and too obscure. But now we are classifying them on the degree with which they affect the secondary sex characteristics of the individual. There are adenomas which have quite a marked effect in causing masculinization of the subject, in some instances almost approaching hermaphroditism. There is another group that Robert Meyer calls arrhenoblastoma, which produces peculiar masculinization, with growth of hair on the face and other parts of the body and changes in voice. There are still other tumors which produce various types of alteration in the bodily conformation and mentality of the patient.

We are classifying these tumors without much regard to structure, because each particular type varies in structure and the degree of masculinization which they produce.

There are other ovarian tumors which affect the endometrium and the breasts. These are of a different order, but they show they are produc-

ing the special hormone which causes these particular changes in other parts of the body.

We are less interested, then, in the exact morphology of ovarian tumors and devoting attention to the physiological properties.

Recently, Dr. Ferguson in our laboratory has brought to light an extremely interesting physiological reaction of a very common tumor, melanoma. The story is very interesting. Zondek found that a certain fish, *Elritza*, a German fish with brown spots on its belly, showed red spots during the breeding season, and he conceived the idea that this was due to some influence of the pituitary body upon the chromatophores. He injected the hormone of the intermediate portion of the pituitary gland into a number of fish, and he found that the *Elritza* was the only fish which reacted specifically. Normal subjects do not show intermedin in the blood. Ferguson conceived the idea that if this agent has a particular relation to the chromatophores, it may be in excessive proportion in melanoma. He injected the fish with the urine from a case of melanoma, and in twenty minutes the brown spots turned red. We are using this test for the diagnosis of melanoma with some satisfaction, because it requires pathologists to be very careful before making a diagnosis of melanoma, especially with non-pigmented tumors. This is another instance, a very dramatic instance, I think, of an important hormone relation of a common tumor, and we shall have to look at this tumor in a different light from the one we have been employing in the past.

These are some of the physiological properties which are specific for the different forms of malignant tumors. I have no doubt that similar relations control the origin and progress of some other tumors.

There is little doubt on the part of those who are most familiar with this subject that mammary cancer is very largely related to abnormalities of secretion of the sex glands. We already have some evidence to that effect. Our whole attack upon cancer today is directed from the point of view that these are specific diseases, with peculiar, general effects in the body, which we have been wholly neglecting up to a very recent time.

We might go on further in this theme of the specific nature of cancer, if we could take up the question of histogenesis and show how ex-

tremely specific the origin of the different tumors really is. Tumors do not arise from any tissue indifferently. They arise under extremely narrow conditions from Schwann cells or the nerve trunks or from the ganglion cells, or from embryonal portions of brain tissue in brain tumors or from the ducts of the breast, or from the sex cells of the testis.

All these facts relating to the general etiology, exciting factors, physiology, structure, and histogenesis of tumors, lead to the conclusion that cancer includes a great number of specific diseases each with its own peculiarities, which must be fully understood if the diseases are to be intelligently handled. A very important practical conclusion necessarily follows. We may no longer consider cancer as merely an occasional, although often substantial, phase of the work of the general surgeon or the specialist in different fields.

The medical profession has reached the conclusion that the time has come when specialization must be developed in the control of cancer. That movement has gained momentum the world over. We find everywhere in advanced medical centers the conclusion that much greater specialization must be developed if we are to give the cancer patient the best treatment. Therefore, we find cancer institutes and cancer hospitals and organized services in general hospitals, and general surgeons specializing more and more in particular fields of cancer. They always did specialize. Some of the leading surgeons of this country have devoted all of their splendid energies to the development of a single form, and, numerically, not a very important form, of malignant tumors, those of the brain and nervous system. There have always been specialists in the field of mammary cancer. One may go down the line and show that specialization is nothing new. I believe, however, there

is going to come greater specialization than we have now. To accomplish these results we must agree upon concentration of material as far as possible, organization of service and specialization in the study and treatment of cancer. In this way, the special surgeon or cancer specialist will gain enough experience to be able to anticipate complications, to know, when he meets a type of tumor, what is likely to happen, and to anticipate or prevent complications. I see that coming everywhere, even in institutions such as ours, where we see great numbers of cancers of all types. We make errors in diagnosis and treatment. I think we make fewer than we should have made if we had had less experience. Therefore, I believe personally in the concentration of cancer patients in cancer institutes.

Further, I think, in the education of doctors we have to recognize that some organization in this field is necessary, and that the undergraduate and postgraduate instruction in cancer may not be left to take its chance with the vicissitudes of the average college curriculum. Some coördinating officer is required to supervise this whole field.

We must start early with the work of training the younger men in the conception of the great scope and practical importance of the cancer field.

The medical profession also must be willing to continue its loyal and effective support of all the agencies which are now centered upon the education of the public and the improvement of facilities for the modern study and treatment of cancer.

We may, therefore, express full approval of the generosity of the good woman who has aided substantially in the work in this direction, at Minneapolis, and has created this lectureship which I have had the pleasure and honor of filling this morning.

TRANSURETHRAL ELECTRIC RESECTION OF THE PROSTATE*

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THIS paper is based upon a review of 282 transurethral resections performed upon a series of 259 patients. During the past eighteen months I have performed only one prostatectomy and this in a patient in whom it was impossible to introduce the resectoscope (because of the enormous size of the prostate) although three different attempts were made to do so. Of the 282 transurethral resections, twenty-three patients had multiple resections, that is, in about 8 per cent a second resection was necessary. In some of the very large prostates, that is, in cases with very large lateral and middle lobes, the middle lobe and one of the lateral lobes were removed at one sitting and the remaining lobe at a subsequent resection. In some of the early cases not enough tissue was removed and a second resection was necessary.

Age Incidence.—The youngest patient upon whom a resection was performed was thirty years of age and the oldest was eighty-nine. A review of the age incidence is given in the following table.

Years	Cases
30-40	2
40-50	7
50-60	52
60-70	121
70-80	64
80-90	13

Duration of Symptoms.—The onset of prostatic obstruction is a very gradual one and the development of symptoms is slow. The course of the disease is progressive. A review of the duration of symptoms in this series showed the following:

Years	Cases
1-5	165
5-10	61
10-15	21
15-20	12
Average	4.22

Infection.—In a great number of cases there occurs sooner or later some infection of the urinary tract that requires pre-operative treatment. In this series of cases bacteriologic study of the urine showed the following:

B. coli.....	69 cases
Staphylococcus albus.....	57 cases
Streptococcus hemolyticus.....	10 cases
Staphylococcus hemolyticus	6 cases
B. coli hemolyticus.....	3 cases
B. proteus.....	2 cases
Eberthella	1 case

Total number cases infected..... 148

Residual Urine.—When a patient with prostatic obstruction consults the physician, examination shows the presence of residual urine. The amount varies in each case and may change from day to day in the same patient. In the following table are given the number of cases and the amounts of residual urine over 250 c.c. up to complete retention.

Complete retention.....	52 cases
500-1000 c.c.	21 cases
250- 500 c.c.	33 cases
	106 cases

Preparation of Patients.—It is of prime importance that the infection be controlled or entirely cleared up, if possible. The internal administration of urinary antiseptics as well as a large quantity of fluid is part of our routine. Fluids are administered by mouth, per rectum, and, in rare cases, normal salt solution is given subcutaneously. In the cases of mild infection, massage of the prostate with instillations and irrigations will suffice. In the more severe infections it is necessary to employ an indwelling catheter. Finally, suprapubic cystotomy may be necessary where the indwelling catheter fails to clear up the infection or where its presence produces pain, bleeding, profuse discharge, or

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reactions in the form of chills and fever. Where complications, such as large stones, are present, it may be necessary to do a suprapubic cystostomy.

The following table gives the method of preparation which was employed in this series:

Indwelling catheter	118 cases
Suprapubic cystostomy	30 cases
Massage and irrigations.....	32 cases
No preparation.....	79 cases

Associated General Conditions.—It is of great importance in this group of patients that the patient have a comprehensive physical examination and an accurately written history. Many of these patients suffer from organic diseases involving other parts of the body, which call for treatment before the resection is undertaken. You are all familiar with the fact that a large number of patients with prostatic enlargement have some disturbance of the cardiovascular system. Many of these need preoperative study and treatment. A certain number have other organic lesions.

Patients with cardiac disease, when first seen, appear to be poor surgical risks but after proper treatment the majority can be safely operated upon. There will always remain a limited number in whom the cardiac function can never be improved sufficiently so that a major surgical procedure is justifiable. But it is especially in the cardiac group of cases that this form of treatment has a wide field of usefulness. Formerly patients who had had attacks of angina or coronary disease were looked upon with a great deal of apprehension regarding their ability to withstand a surgical procedure, but today, by means of transurethral resection, their equilibrium remains undisturbed.

The following table shows the incidence of associated organic lesions found in this series:

ASSOCIATED DISEASES

Cardiovascular System

	Cases
Myocarditis	119
Coronary disease.....	18
Angina	9
Hypertension	45
	—
	191

Diabetes	12
Lues	6
Cord bladder	4
Pulmonary embolism.....	2
Bronchial asthma	2
Cerebral thrombosis.....	2
Carcinoma stomach, liver.....	2
Hemiplegia	1
Manic depressive psychosis.....	1
Paralysis agitans.....	1
	—
	33

Associated Genito-urinary Disease.—As a result of obstruction at the vesical orifice there develops, sooner or later, definite damage to the bladder and upper urinary tract with resulting stasis which predisposes to infection. Hence, a matter of great importance is a complete and careful survey of the entire urinary tract in each case before resection is done. In the following table the incidence of associated findings is given.

ASSOCIATED GENITO-URINARY CONDITIONS

	Cases
Diverticula of bladder.....	24
Bladder calculi	14
Carcinoma of bladder.....	11
Prostatic calculi.....	8
Kidney calculi	6
Ureteral calculi	2
Solitary kidney	2

Postoperative Course.—One of the most encouraging phases of this form of treatment has been the mild postoperative course. As previously mentioned, the stay in the hospital is very short and shock is absent. The general condition of the patient the day after operation stands out in marked contrast to that of the patient who has undergone a surgical prostatectomy. In other words, the patient who has been subjected to a surgical procedure is generally quite ill the day after, whereas the patient who has had a resection is well enough to sit up in bed and often is reading the morning paper when the physician makes his rounds.

Postoperative Stay in Hospital.—While it is true that a certain number of patients who have had prostatectomies do not stay in the hospital very long after operation, the average patient, if one takes the cases as they come, spends a long time there. The average stay of prostatectomized patients has been variously estimated to be from three to six weeks.

For purposes of discussion I have divided the cases in this paper into two groups. In Group I are the patients who have been prepared with the indwelling catheter, intermittent catheterization, massage and irrigations. A review of this group shows that the average duration of hospital stay was 8.5 days. Cases with median bars and small middle lobes naturally stay a much shorter time than those with large hypertrophies. The shortest stay in the hospital has been two days.

Group II consists of the patients who have had cystostomies because of complications in the bladder, such as diverticulum, stone, or severe infection, which precluded the preparation of the patient by an indwelling catheter. Also in this group are patients who have had suprapubic cystostomy as a palliative treatment for carcinoma of the prostate. This group comprises 30 resections. The average stay in the hospital was 15.5 days.

ANALYSIS OF POSTOPERATIVE HOSPITALIZATION

Cases prepared by suprapubic cystostomy.....	15.5 days
Cases prepared by catheter.....	8.5 days
Cases receiving no preparation or only mas-	
sage	7.0 days
Average stay (all cases).....	8.6 days
Shortest stay (all cases).....	2.0 days

Postoperative Temperature.—Early in the use of electroresection it became apparent that fewer patients had temperature reactions, and when postoperative fever occurred it was of much shorter duration than in patients who were surgically treated.

The temperature following this procedure may be due to one of three causes. First, it is a well known fact that following instrumentation such as the passage of sounds, catheters, bougies or cystoscopes, many patients develop a fever. Second, the temperature may be prostatic in origin. A large number of patients with prostatic obstruction have an associated infection and following the resection the fever may be due to a lighting up of a previously present infection in the prostate. The third cause for temperature in a large group is pyelitis or pyelonephritis. The onset of fever with or without a chill, with pain and tenderness in the renal area makes the diagnosis easy. In a certain number of cases in which fever is present but pain and tenderness are absent, it is possible that the patient may have a mild pyelitis, severe enough to produce

temperature reactions and yet not produce enough pain to call attention to the possible renal origin of the fever. From an academic standpoint this question could be determined by ureteral catheterization but it is my opinion that it is not of sufficient importance to justify ureteral catheterization.

An analysis of the temperature reactions is given in the following table:

POSTOPERATIVE TEMPERATURE

Having no temperature.....	17 resections
Having had temperature.....	265 resections
Average duration of temperature.....	2.4 days
Temperature for 1 to 2 days only.....	168 resections

TEMPERATURE RANGE

Temperature	Resections
99-100°	75
100-101°	88
101-102°	51
102-103°	24
103-104°	26
104-105°	1
Fever	265
No fever	17
	282

Hemorrhage.—A certain amount of blood persists in the urine for a few days following the resection, the amount depending in part upon the care and attention given the control of bleeding at the time of operation. I try to have the patients go back to the room free or relatively free from bleeding. In some of the smaller prostates many patients go back perfectly dry and in others the urine is clear the next day. In the average case, however, the urine is blood tinged for two or three days. A small amount of bleeding may persist in an occasional case for a week; that is, after the patient has left the hospital a few specks of blood may be found in the voided urine.

Secondary bleeding occurs in a small number of patients, beginning generally on the tenth or twelfth day. Similar to what occurs after surgical procedures in any other part of the body, secondary bleeding is nearly always due to infection. This is not surprising if we bear in mind that many of these patients had infections before resection.

Secondary hemorrhage in this series occurred in six cases.

The management of secondary hemorrhage has been along the following lines: In a good many cases the bladder fills with blood clots and these we evacuate with a Bigelow evacuating canula and pump followed by irrigations of the bladder with a mild potassium permanganate solution. This simple procedure serves to control the hemorrhage in most cases of secondary bleeding. In some cases it was necessary to control the bleeding with the resectoscope. As a rule, after the resectoscope has been introduced the bleeding point can be seen and the fulguration current applied directly to it. In some instances, instead of fulgurating the bleeding point, I have excised the bleeding area so as to have a fresh, clean, non-infected area for wound healing.

Epididymitis.—In the early part of the series no attempt was made to prevent epididymitis for the specific purpose of determining whether or not epididymitis occurred more frequently following resection than after suprapubic prostatectomy. A review of the first 110 cases showed that in this number there were fifteen cases of epididymitis. Since that time we have made it a routine to obtain the patient's permission for vasectomy in all cases except in relatively young men. Since the establishment of routine vasectomies we have had no further complications of this type. It is a simple procedure to remove about an inch of the vas deferens and this, I believe, more completely prevents epididymitis than does the subcutaneous ligation.

General Complications.—I have been greatly impressed by the absence of general complications following the use of the resectoscope. A review of this series of resections shows the following postoperative complications.

	Cases
Singultus	6
Bronchopneumonia	2
Psychosis	2
Pulmonary embolism.....	1
Cerebral thrombosis.....	1
Parotitis	1

Persistence of Symptoms Following Resection.

—Because of the relatively short stay in the hospital and because the patient is up and about there are certain symptoms that are more frequently emphasized on the part of the patient than when the patient has had a suprapubic prostatectomy followed by a long stay in the

hospital. Under the latter circumstances, when the patient's fistula heals, he leaves the hospital; wound repair of the prostatic bed has generally been complete and the symptoms are mild. Following transurethral resection the wound is not healed at the end of a week when the patient leaves the hospital and, naturally, certain annoying symptoms are present. Chief among these are frequency, pain and burning on urination. It is extremely gratifying, however, to see how rapidly these symptoms disappear. As a rule they persist for a week or ten days after the patient leaves the hospital, but are readily controlled by means of alkalies and sitz baths.

Residual Urine.—In some cases a certain amount of residual urine is present after the patient leaves the hospital, but in my experience this clears up rapidly; hence it cannot be considered a disturbing element. I would like to mention one particularly striking case, a patient, eighty-eight years of age, who had a residual urine of 2,000 c.c. before resection. When he left the hospital he had six ounces of residual urine and with catheterization and irrigation this was reduced to one ounce. In several cases it was necessary to do a second resection to relieve this condition completely.

Incontinence.—In a few instances the difficulty in controlling the urine was such that the patients were obliged to wear a cloth after leaving the hospital, but under treatment this condition rapidly cleared up. In one case of carcinoma of the prostate the incontinence was disturbing for a long time, probably because the carcinoma was extensive and had infiltrated the sphincter so that it was injured during the resection, and in one case of benign hypertrophy the patient wears a glove at night, although on many mornings his glove is dry.

Mortality.—In this series of 282 resections there were eleven deaths, a mortality of 3.9 per cent.

SUMMARY

Transurethral resection for the treatment of bladder neck obstruction, either benign or malignant, is a distinct advancement in treatment. It makes treatment possible in a group that heretofore were denied major surgery. A short period of hospitalization is an added advantage to many people, particularly at the present time.

122 South Michigan Avenue

LIPOMA OF THE CAPSULE OF THE JOINT REMOVED SUCCESSFULLY: PRESENTATION OF THREE CASES*

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TWO distinct types of lipoma of the capsules of the joints have been described. The first type represents a true lipoma arising from the extracapsular fat. The second type is the so-called lipoma arborescens and is usually described as intracapsular; it represents an unusual type of involvement of the synovial membrane with markedly hypertrophied villi; often excessive deposits of fat are present. The three cases reported here belong to the first group; the lipomas arising from the extracapsular fatty tissues.

REPORT OF CASES

Case 1.—A man, aged forty-eight years, complained of painless, gradually increasing swelling on the inner side of the right knee which had been present for several months. There was no history of injury.

Examination disclosed an elongated mass lying beneath the vastus internus muscle on the anterolateral surface of the lower end of the femur. The mass could be fairly well outlined and was not attached to the bone. The roentgenogram showed the outline of the tumor clearly and a diagnosis of lipoma was made (Fig. 1).

The lipoma, weighing 40 gm., was excised from the extracapsular fat of the knee joint. It lay directly beneath the vastus externus muscle. The patient's recovery was complete when he was last heard from early this year.

Case 2.—A man, aged thirty-five years, had noticed progressive enlargement of the upper portion of the left thigh for about five months. At no time had there been any pain. A week before admission to The Mayo Clinic operation had been performed elsewhere, at which time exploration was apparently done but tissue was not removed. The patient's family were informed that he had an inoperable sarcoma.

Examination disclosed a mass about 10 cm. in diameter lying beneath Poupart's ligament on the upper mesial border of the thigh. It was not tender. A sense of fluctuation resembled that of a cold abscess but evidence of tuberculosis of bone could not be detected. A shadow in the roentgenogram in this region was typical of the consistence of a lipoma, and a preoperative diagnosis of lipoma was made (Fig. 2). A lipoma, weighing 338 gm. was removed from the thigh. It had originated from the pericapsular fat of the hip joint in the region of the lesser trochanter. The patient's convalescence was uneventful and when

last heard from a year or more after operation he was in good health.

Case 3.—A woman, aged forty-one years, had complained of pain in the region of the left hip and but-



Fig. 1 (Case 1). Anteroposterior and lateral views of knee joint; the shadow of a lipoma beneath and mesial to the quadriceps tendon may be seen.

tocks for about five years, and for about eleven months had noticed gradually increasing swelling. Five months previous to her admission to The Mayo Clinic an operation had been done elsewhere and a portion of the tumor excised. The swelling and pain persisted, however, with occasional severe paroxysms of sciatic pain.

An extensive swelling of the left buttock and hip extending forward beneath Poupart's ligament was found. Rectal and pelvic palpation disclosed a distinct mass about 8 cm. in diameter inside the pelvis in the region of the greater sciatic notch on the left side. The extensive shadow in the roentgenogram was that of a typical lipoma (Fig. 3).

At exploration the pelvis was opened retroperitoneally through a long oblique incision. The tumor was found to lie behind and beneath the iliac vessels in such a position as to be inaccessible from an anterior approach. The abdominal muscles were closed over this area and from below the iliac crest the fascia lata was separated well back toward the posterior superior spine of the ilium. The gluteus maximus and medius muscles were retracted and the entire tumor was removed. It had originated from the extracapsular fat about the hip joint, and extended over the entire lateral wall of the ilium; a portion of it, about 8 cm. in diameter, had pushed its way through the sacrosclatic notch into the pelvis and had forced its way down along the sciatic nerve posterior to the femur. It had also grown anteriorly along the neck of the femur to the region be-

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neath Poupart's ligament. The tumor weighed 1,330 gm. Recovery was uneventful and the patient has recently written that her health has practically returned

these extracapsular lipomas arising in the region of the buttocks. Kuttner, Müller, and Weitzner have described cases similar to Case 3 of this

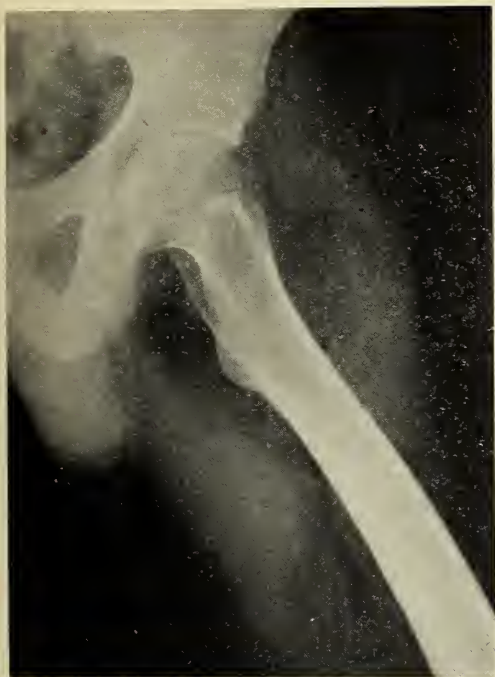


Fig. 2 (Case 2). Roentgenogram of a large lipoma surrounding the upper end of the femur adjacent to the joint capsule.

to normal, although there was a prolonged period during which she suffered from pain suggestive of sacroiliac strain.

COMMENT

The demonstration of these tumors by roentgenogram is most important from the diagnostic standpoint. One may suspect the presence of a lipoma by palpation, but in each of these cases the roentgenogram indicated the probable diagnosis. Laurell credits Köhler with first pointing out the roentgenologic evidence in these cases. Sutherland has demonstrated the roentgenologic appearance of lipomas as have other roentgenologists. The lipoma must become fairly large before a roentgenologic diagnosis is possible, although if small lipomas are situated favorably, their presence may be demonstrated. In any tumor of appreciable size of the soft parts of an extremity, the roentgenogram should be enlisted as a diagnostic aid. Lipomas may occur in any part of the body where there is fat tissue. Several reports have been noted in the literature of



Fig. 3 (Case 3). Roentgenogram of the pelvis with an extensive lipoma involving the region of the left iliac fossa and surrounding the upper end of the left femur. The shadow which represents one edge of the lipoma passes through the date line on the roentgenogram.

series. In all of these cases pressure on the sciatic nerve produced complicating symptoms.

Other observers have reported cases of intramuscular and intermuscular lipomas, some of which may have had their origin from the region of the capsule of the joint. These tumors can be removed without serious difficulty, although it should be pointed out that in two of the cases reported here unsuccessful attempts at removal had been made before the patients were admitted to the clinic. The results with complete removal are excellent and well justify the surgical risk.

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OCCIPUT OBLIQUELY POSTERIOR*

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THERE is perhaps no abnormal presentation of the fetus that has received more attention than has occiput obliquely posterior. However, the degree of seriousness accorded it varies widely in different clinics, due to the fact that the methods in different clinics vary widely in the manner in which labor terminates.

After seeing labor, with this presentation, conducted in both the conservative and radical clinics of this country, I have very definite ideas as to which of these two clinics should be followed by the general practitioner, and I would like it understood from the beginning that I want this paper to be considered a plea for conservative treatment.

I assume that this paper is being read for the benefit of the general practitioner and I think that, too often when discussing this subject in the past, we have assumed all our listeners to be specialists, or at any rate that a procedure which would be in the best interests of the mother and child, when conducted by a specialist, would be equally in her interest, when by the man in general practice.

I am little concerned with the way in which a well-trained man, with ten or fifteen years of experience, conducts a labor. He is a duffer indeed if, after concentrating on one branch of medicine for such a long time, he cannot perfect his technic so that whatever procedure he may adopt, he can "get away with it." From such men, who are forgetting the general practitioner, we have recommended to us such procedures as the Scanzoni maneuver, the lock and key procedure, version and extraction in occiput posterior, the prophylactic forceps, and the prophylactic version or "Potter twist." What the general practitioner should say to himself is: "I know my lack of skill. I know the conditions under which I have to work. Now what procedure, in my hands, is safest for this mother and her babe?" I am convinced that any sane man, who takes this attitude, will choose the conservative course.

Contrary to what some of the text-books say, the O.D.P. position is next to the O.L.A. in frequency. The reason for this is evident. When, as a result of uterine contractions, force is transmitted through the vertebral column to the head, the longest available diameter of the inlet is sought. This is the right oblique. In the vast majority of cases, the sagittal suture will enter this oblique. If the occiput is on the left, the presentation is O.L.A., if on the right it is O.D.P. The head having entered the bony ring, no change of presentation takes place, when there is no disproportion between the head and the pelvis, until the head passes the spines and emerges on the levator sling. In the normal primipara the occiput then begins to rotate anterior, this rotation persisting until the occiput finally impinges under the symphysis, and the head distends the perineum. In primiparæ, where there are no abnormalities of the head or the pelvis, and also usually in multiparæ, the mechanism of labor is often different from that described above, but we are not concerned in this paper with abnormalities, and occiput posterior rarely offers serious difficulties in the multipara.

If my contention is correct that in the hands of a relatively unskilled man the patient and her baby are safest if labor is handled conservatively, it might be well for me to outline in brief my conception of what is meant by conservative treatment of a case of occiput obliquely posterior.

In the first place, most primiparæ begin their labor with several hours of weak irregular pains. I suppose we are all convinced that these pains accomplish little or nothing. Unless the pains are constant in interval and constant in duration, the cervix, while it may be slightly effaced, is very little dilated. Weak, irregular pains, however, will sap the patient's vitality just as badly as strong effective pains. I think that it is entirely erroneous to say that while the patient is having these ineffective pains, she is in labor. In any case, the thing to know is that they are of very little value and should not be allowed to persist beyond a few hours.

*Presented before the Minnesota State Medical Association, Rochester, May 22, 1933.

If after four or five hours the pains are still irregular and of short duration and the patient is in good condition, she should be stimulated with castor oil or quinine, or preferably both.

cannot conduct a labor intelligently if we get our information concerning pains by talking with the patient on the telephone. The duration of a pain can be measured in only one way, and that is by

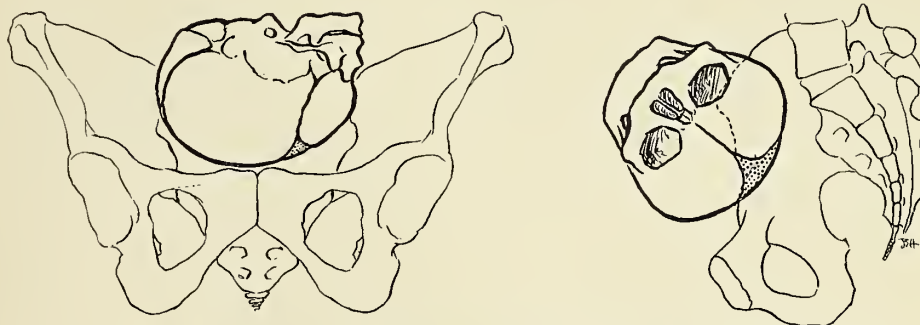


Fig. 1. Head at onset of labor before entering the bony ring; sagittal suture transverse.

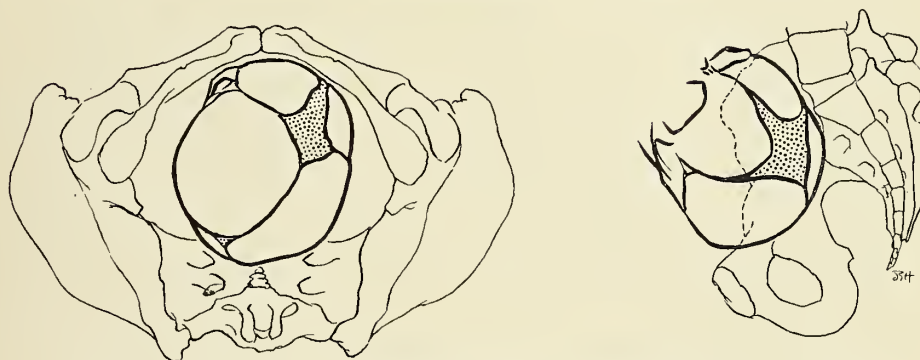


Fig. 2. Head just below the inlet, slightly flexed, O.D.P.; sagittal suture in right oblique.

Not more than two ounces of castor oil and certainly not more than a total of twenty grains of quinine should be given. A hot enema is also very often of great value.

If, however, after four or five hours of irregular pains, the patient evidently needs a rest, or attempts at stimulation have been unsuccessful, she should be given one quarter grain of morphin, with a full dose of some hypnotic. The morphin should be repeated, if necessary, in three hours with the idea of stopping the useless pains and allowing the patient to sleep, if only for a few hours. In the vast majority of cases, measures calculated to stimulate will be successful; where they are not, the patient will often go into labor after she has had a few hours of sleep. In any case, such measures prevent useless dissipation of nervous energy.

How can we tell the duration of a pain? The answer is known to all, but I am afraid that the knowledge is practiced only by the few. We

holding the watch in one hand, placing the other hand on the fundus, and noting carefully the time from the beginning of contraction, to the beginning of relaxation. This takes a little time and patience, but the importance of the information thus gained is absolutely essential if we are to treat the patient conservatively in fact, as well as in name.

When regular pains have finally started and the patient is definitely in labor, the two things claiming our constant attention, throughout the first stage of labor, are sedatives and food.

Different doctors favor different sedatives. Pentobarbital, sodium amytal, and morphin, and scopolamine seem to be the favorites. Whatever our preference may be, it must be clearly borne in mind that any adequate dose of sedative will, in the majority of cases, measurably shorten the duration of the pain.

If labor is shortened, because of the administration of the sedative, this result is accomplished

by the effect of the sedative, in softening the cervix. Our aim, however, in giving the sedative is primarily to conserve nervous energy.

If sedatives ordinarily shorten pains, then they

wholly free from the influence of drugs. This is necessary if she is to use her abdominal muscles most effectively and it is only when this can be done that the majority of primiparæ with an

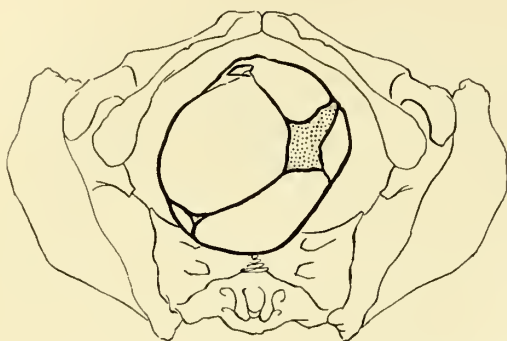


Fig. 3. Head slightly below the spines; rotation just beginning.

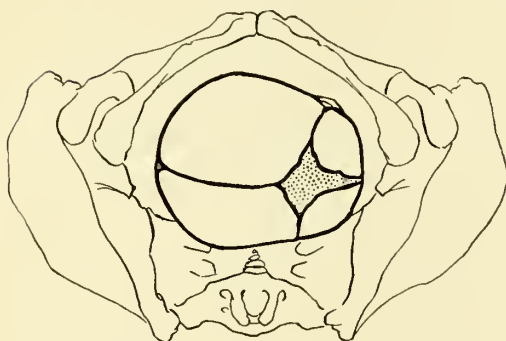


Fig. 4. Head 2 cm. below the spines; occiput rotated 45 degrees; sagittal suture transverse.



should not be given unless the pains are of such duration that they are not made weak and irregular and consequently ineffective by the administration of the drug. Personally, I prefer to wait until the pains are constant in interval and 35 to 40 seconds in duration, before giving any medication. Of the three drugs mentioned above, I personally prefer morphin and scopolamine. It will be noticed, however, that I do not use them ad lib as for twilight sleep, which I believe has been more of a curse than a blessing in obstetrical work. My own plan is to give one-sixth of morphin and one two-hundredth of scopolamine every four to six hours, providing the pains remain 35-40 seconds in duration, but not after the cervix is 8 or 9 centimeters dilated. This routine usually necessitates one, two or at most three injections during the first stage of labor, in the average primipara.

The reason for discontinuing sedatives when the cervix is 8 or 9 centimeters dilated, is that the patient should enter the second stage of labor

occiput obliquely posterior position can deliver without operative interference.

Food, as a factor in sustaining the patient, has been altogether too widely neglected. The attitude of many doctors seems to be that if the patient does not feel like eating, she should not be urged to eat. This shows a woeful lack of understanding of the physiology of labor. If the workman needs to eat, in order to use his biceps, surely the patient using her uterus intermittently, over a period of ten, twelve, or eighteen hours, needs food in order that that organ may function properly. Nor should nourishment consist entirely of fluids. Small amounts of solid food, together with hot drinks, should be given rather frequently. If there is a probability of operative interference, all food should be discontinued when the cervix is eight or nine centimeters dilated.

Occasionally, even where everything possible is done to conserve the patient's energy, labor is still markedly protracted beyond the average du-

ration of the first stage. In such cases the patient often becomes so exhausted that a few hours of sleep are indicated. The doctor who is carefully conducting labor will try to secure this rest

proximately one-half, and I know from personal experience, that in his clinic, only twice in ten months, was operation necessary in occiput posterior positions.

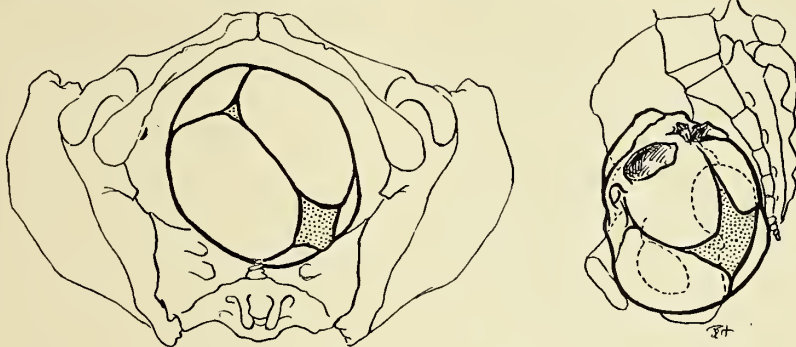


Fig. 5. Head on perineum; occiput rotated to O.D.A.

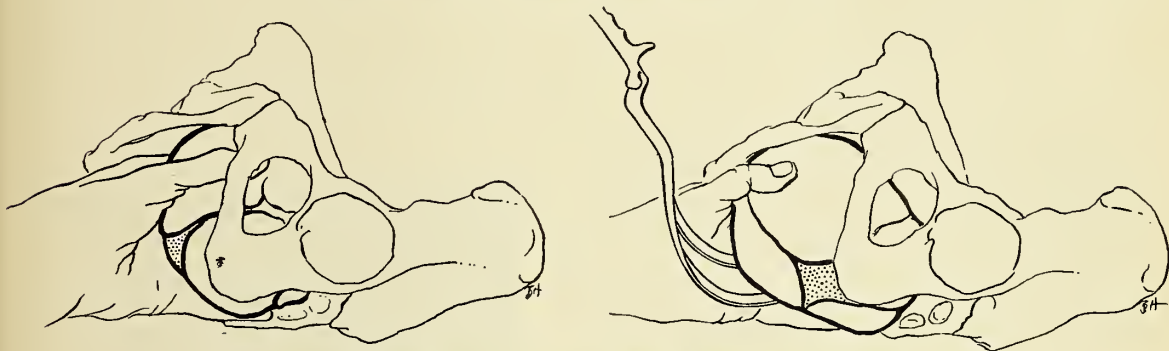


Fig. 6 (left). Sagittal suture transverse; head grasped ready for rotation.
Fig. 7 (right). Head rotated to O.D.A.; right blade of forceps being applied.

before the end of the first stage. There are, of course, different ways in which this may be done. I prefer morphin gr. $\frac{1}{4}$, scopolamine gr. $\frac{1}{500}$ and veronal grs. V. I doubt the wisdom of giving sodium amytal for this purpose, as its action is too prolonged.

When the patient has entered the second stage of labor, the doctor's place is by her side. I regard the conduct of the second stage in O.D.P. positions as of even greater importance than that of the first stage. During every pain the patient's thighs are flexed on her abdomen and she is encouraged to take a deep breath, hold it, pull on her straps and bear down. If she is in the hospital she should be given gas during the actual duration of the pain. Another important thing, of which I believe many doctors are unaware, is the Beck binder. In occiput obliquely posterior positions in primiparæ, this binder should be applied as soon as the cervix is fully dilated. Beck has demonstrated, beyond a shadow of doubt, that its use reduces the duration of labor to ap-

A question sometimes asked is how long should the patient be left in the second stage. At the University Hospital, where we are very definitely committed to conservative measures in obstetrics, the patient is allowed to continue in the second stage for three hours, or even longer, providing the fetal heart tones are normal and the general condition of the mother is good.

Infrequently, even when every possible measure is taken to insure spontaneous delivery, the occiput for one reason or another fails to rotate. Of all the methods which have been devised for handling such cases I believe manual rotation to be the best. The rule in obstetrics is, of course, to apply the left blade first, but if the presentation is O.D.P. the right blade should be applied, following rotation, before the removal of the hand. This blade can then be held in position by the assistant, while the obstetrician applies the left.

The general practitioner should forget the key

and lock maneuver and the Scanzoni double application of forceps. There are some obstetricians, who, after prolonged practice, have become more or less skillful in version and extraction in posterior positions, but inasmuch as in unskilled hands one breech in three is lost during extraction, I doubt the wisdom of recom-

mending this method for general use.

In conclusion, may I again emphasize the importance of sedatives, food, and the binder, in the conservative handling of the case, and I am confident, from experience, that if these things are properly used, the devices of the trickster will seldom be found necessary.

MECKEL'S DIVERTICULUM IN A HERNIA: REPORT OF A CASE*

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OF all reported cases of Meckel's diverticulum in hernia, in slightly more than half the abnormality has been found in the inguinal region, and the majority of these on the right side. In almost one fourth of the cases, the diverticulum was in an umbilical hernia, and in almost another fourth, in a femoral hernia. These and other facts are expressed numerically in Table I.

Age was found to be a factor only in the cases of diverticulum in umbilical hernia; among the twenty-five such cases included in Pabst's review, nineteen of the patients were newly born or very young infants, and the age of the remaining six patients was not stated. The average age of the patients with diverticulum in inguinal hernia was thirty-five and six-tenths years; the youngest was aged one year and three months, and the oldest, seventy-seven years. Of the twenty-four patients with diverticulum in femoral hernia, the average age was forty-eight and seven-tenths year; the youngest was thirty years, and the oldest, seventy-six years. Among the patients who had diverticulum in inguinal hernia there were three times as many men as women, whereas just the reverse obtained in regard to the patients who had diverticulum in femoral hernia. The sex of the infants with diverticulum in umbilical hernia was given so infrequently that no reliable data could be obtained.

The choice of surgical procedure depends chiefly on individual circumstances. If the base of the diverticulum is of such size that it can be treated as the stump of the appendix commonly is treated, by ligation and inversion, with-

out rendering inadequate the diameter of the intestinal lumen, this is perhaps the best procedure. However, excision of the diverticulum, with transverse closure, may be necessary. If

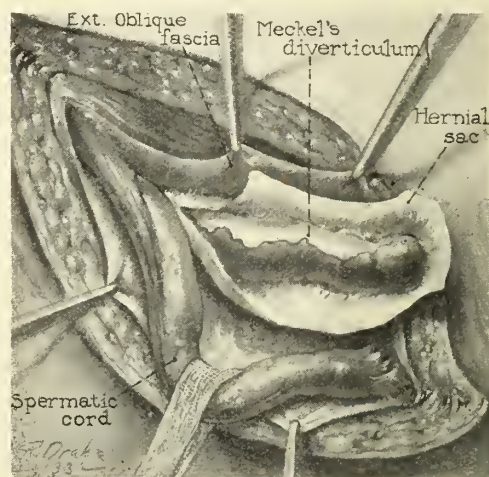


Fig. 1. The structures exposed at operation.

there is any doubt as to the patency of the intestinal lumen, entero-anastomosis should be made to insure against occlusion. The whole structure may be returned to the abdominal cavity, the rupture repaired, and a separate incision made to remove the diverticulum. In this manner, the field in which the hernia is repaired is protected against possible soiling.

Meckel's diverticulum in inguinal hernia has been reported so rarely, that to place on record one such case that has been observed recently seems justifiable.

*From the Division of Surgery, The Mayo Clinic, Rochester, Minnesota.

REPORT OF CASE

A French-Canadian laborer, aged thirty-eight years, entered The Mayo Clinic April 22, 1933, complaining of a hernia which, he said, had been present for six months. Otherwise, his general health had been good. When first noted, the protrusion of the abdominal wall in the right inguinal region had been about 2.5 cm. in diameter and had been noticeable only when the patient was on his feet. There had been a dull, aching pain in the inguinal region. The patient gave no history that would indicate that incarceration had taken place, nor had he ever worn a truss. His systemic history was essentially negative.

The patient was rather thin, although well developed. The right external inguinal ring was not enlarged. On the patient's coughing, a soft swelling, about 5 by 2 by 2 cm. could be felt over the right internal inguinal ring and swelling was also palpable along the canal. This could be replaced with ease. Examination in other respects was essentially negative.

Exploration through a right inguinal incision revealed

a right indirect inguinal hernia, the sac of which extended down to just below the external ring. The sac

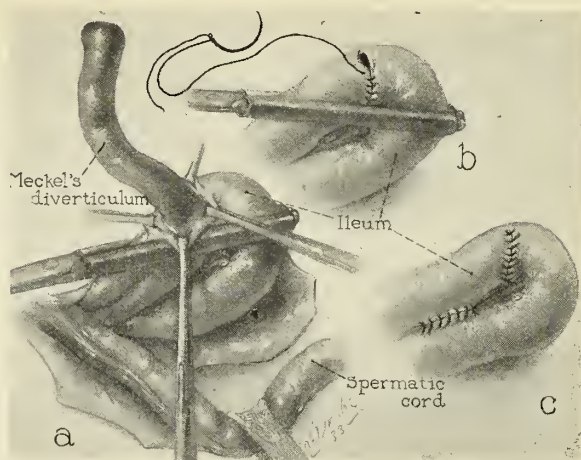


Fig. 2. Method of excision and repair.

TABLE I. REPORTED CASES OF MECKEL'S DIVERTICULUM IN HERNIA

Author and year	Cases	Inguinal	Femoral	Umbilical
Pabst, Beitr. z. klin. Chir., 69:646, 1910	123*	66	24	25
Wellington, Surg., Gynec. and Obst., 16:74, 1913	27**	14	2	10
Burianek, Quoted by Sweet	1	0	1	0
Harf, Deutsch. med. Wchnschr., 2:881, 1919	1	0	1	0
Quénu, Bull. Soc. Anat. de Par., 91:206, 1921	1	1	0	0
Bettman, Internat. Clin., 3:126, 1921	1	1	0	0
Ludbrook, Brit. Jour. Surg., 10:297, 1922	1	0	1	0
Brodnax, Jour. Am. Med. Assn., 82:440, 1924	1***	0	0	0
Lanman, Boston Med. and Surg. Jour., 190:926, 1924	1	1	0	0
Littler, Brit. Med. Jour., 1:517, 1924	1	0	1	0
Harrington, Surg. Clin. N. Amer., 6:1188, 1926	1	0	1	0
Bianchi, Gazz. d. osp., 48:651, 1927	2	1	0	1
Oliva, Gazz. d. osp., 48:1013, 1927	1	1	0	0
Sicard, Bull. et mem. Soc. nat. d. chir., 54:478, 1928	1	0	0	1
Reid, Brit. Med. Jour., 1:394, 1928	1	1	0	0
Pollidori, Riforma med., 46:682, 1930	2	2	0	0
Sweet, New England Jour. Med., 202:997, 1930	1	0	1	0
Donati, Policlinico, 38:278, 1931	1	0	1	0
Gray, 1933. Present report	1	1	0	0
Totals	169	89 (52.6%)	33 (19.5%)	37 (21.8%)

*One of the 123 cases observed by Pabst himself. To make the total 123, add one retrocecal hernia and seven cases in which the situation was not stated.

**In four instances the references given by Wellington were included in Pabst's series; undoubtedly, there were others but this could not be determined definitely. To make the total twenty-seven, add one case in which the situation of the hernia was not stated.

***Through the greater sciatic foramen.

was isolated from the spermatic cord and was found to contain an indeterminate structure which was densely adherent to the posterior wall of the sac. The proximal end was lost within the internal ring (Fig. 1). This structure was thought to be the appendix, but after the adhesions which bound it to the posterior wall of the sac had been separated, and the proximal end of the structure had been delivered from within the internal ring, it was seen to be attached to the small bowel. There was no distinct mesentery, but several tortuous vessels traversed the structure longitudinally. The base of the diverticulum was somewhat dilated, measuring approximately 2.5 cm. across. For this reason, it did not seem wise to ligate the stump, with subsequent inversion. The diverticulum was removed by a longitudinal, elliptical incision in the bowel, ap-

proximately 3 cm. in length. In order to maintain an adequate lumen, the incision in the bowel was closed transversely (Fig. 2). As a further precaution against occlusion of the bowel at this point, a small entero-anastomosis was made, which shunted the direct intestinal stream around the original suture line. Great care was exercised to guard against contamination of the wound, and all intestinal contents were then returned to the abdominal cavity through the internal ring. The sac was ligated, excised, and transfixed. The abdominal wall was repaired by approximating conjoined tendon to shelving edge of Poupart's ligament, and lapping the external oblique fascia over the spermatic cord. Convalescence was uneventful and the patient was dismissed from the hospital on the sixteenth postoperative day.

THE CARE OF THE PREMATURE INFANT*

A. V. STOESEER, M.D., and E. C. PERLMAN, M.D.

Minneapolis

THE care of the premature infant has always been a difficult and trying problem in the large municipal hospital. Not one or two, but instead as many as twelve premature newborns must be observed at one time. The various methods used from year to year to bring about the best results in the management of these small infants have always been of great value in perfecting a more suitable program.

At the Minneapolis General Hospital we have passed through several phases during which different procedures have been used. During the past year a method has been followed which is characterized by its simplicity and by the fact that it permits a fairly large number of premature infants to be rather easily handled with satisfactory results.

It is the purpose of this paper to present our experiences and to emphasize the factors which must be given special consideration in the care of the premature infant. From July 1, 1932, to July 1, 1933, 1,803 babies were admitted to the newborn nursery of the hospital. Of this number 139 were considered premature newborns. There were seventy-three male infants and sixty-six female.

PREMATURE MORTALITY

Forty-seven premature babies (34 per cent) died and twelve of these never responded to the usual methods of resuscitation and stimulation for they expired within one hour of birth. Another nineteen responded fairly well at first, but their condition again became bad, and they died before the end of the rest period, which is the first sixteen hours of life, during which the infants receive no water or food, and are not disturbed unless resuscitation is necessary. Six more babies had intermittent cyanosis throughout the first and second days of life. They expired within forty-eight hours of birth.

Thirty-seven premature infants (27 per cent) died within the first two days of life, and it is interesting to note that irregular breathing and cyanosis were the outstanding clinical findings in practically all these babies. The autopsies revealed in almost every instance intracranial hemorrhage, pulmonary atelectasis, or both. There were only three exceptions. One infant had numerous congenital anomalies and another had a large tumor of the roof of the mouth. The third baby had a hemorrhage from the liver.

Only ten (7 per cent) of the premature infants died after the end of the second day of life. Of this number five expired before the tenth day during that period when the feedings are

*From the Department of Pediatrics, University of Minnesota, and the Pediatric Service, Minneapolis General Hospital. Presented before the Northwestern Pediatric Society at the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 22, 1933.

TABLE I. PREMATURE MORTALITY

Length of Life	Number	Per Cent	Average Birth Weight
Less than 1 hour.....	12 } 37	8.6 } 27	960 grams
From 1 hour to 16 hours.....	19 }	14.0 }	1,158 grams
From 16 hours to 48 hours.....	6 }	4.4 }	1,372 grams
From 48 hours to 10 days.....	5 } 10	3.5 } 7	1,915 grams
More than 10 days.....	5 }	3.5 }	2,033 grams

TABLE II. CAUSES OF DEATH
(Infants dying after 48 hours)

Case No.	Birth Weight	Days of Life	Clinical and Pathological Findings
G-1	2,490 grams	4	
L-2	1,000 grams	5	
C-3	2,100 grams	10	Bronchopneumonia and middle ear infection
C-4	1,700 grams	10	Marked diarrhea and respiratory infection
H-5	2,280 grams	10	Marked diarrhea and middle ear infection
D-6	2,200 grams	14	Diarrhea and respiratory infection
M-7	1,425 grams	14	Diarrhea and respiratory infection
D-8	2,075 grams	19	Bronchopneumonia and middle ear infection
C-9	2,170 grams	22	Erysipelas
D-10	2,300 grams	31	Erysipelas

gradually being increased to meet the caloric requirements. Three of these infants had respiratory infections with marked diarrhea and bronchopneumonia as terminal manifestations. The cause of death in the other two babies was not determined although a thorough study was made. No evidence of infection was found.

Five infants died after the tenth day of life, three from respiratory infections and two from erysipelas. While intracranial hemorrhage was quite frequently the cause of death during the first few days of life, an infection of the respiratory tract was the most common cause later. Although very few of our premature infants had respiratory infections, the mortality was rather high on account of poor resistance (Tables I and II).

Ninety-two premature babies completed satisfactorily their stay in the hospital. They were discharged in good condition soon after their weight was more than 2,500 grams. The average length of hospital stay was fifty-nine days for those weighing 1,500 grams or less at birth, forty-four days for those weighing between 1,500 and 2,000 grams, and twenty-three days for those weighing over 2,000 grams. The excellent results

obtained with all these babies we feel depended not only upon a thorough understanding of the factors concerned in care of the premature infant but also upon the order of their significance.

NURSING CARE

Intelligent nursing care was considered to be first in importance. We have had during the past year very good coöperation on the part of our nursing staff. Many physicians do not realize that a well trained nurse can do more good for the premature baby than many of their orders. The nurse in charge must know how to weigh, bathe and clothe the infant with the least amount of exposure and disturbance. She must understand how to regulate the temperature of the incubator so that the baby's temperature remains within the proper range. The nurse must know how to feed the infant. She must observe what method of feeding gives the best results. The physician can suggest the different methods to be used but it is the duty of the nurse to indicate which one fits the premature baby the best. It must be remembered that the infant should not become fatigued while being fed. There should be very little regurgitation.

BODY TEMPERATURE

The maintenance of proper body temperature from the moment of birth was given second consideration. Preparations were made before

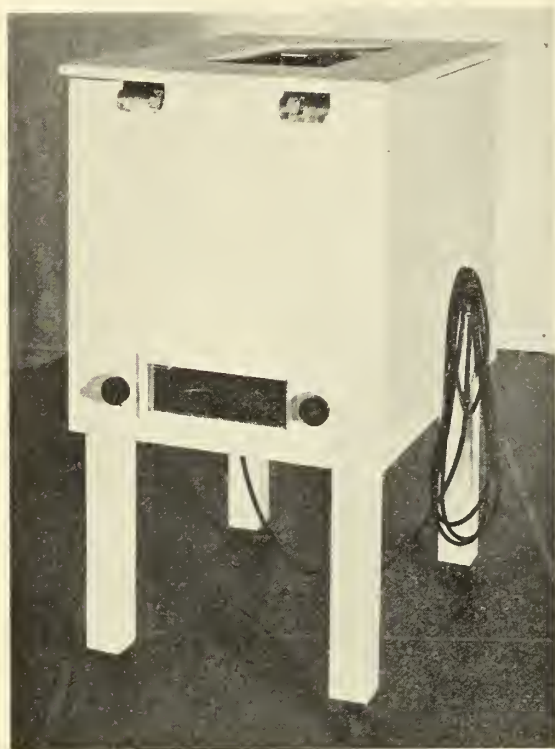


Fig. 1. Premature incubator with the cover lowered.

the baby was born. We always requested that a newborn bassinet be heated to a temperature of 96° F. and that an unopened pack containing sterile cotton batting be kept in readiness. As soon as possible after birth, the infant was placed in the warm bassinet and wrapped in the sterile cotton. A soft absorbent towel was folded and placed at the buttock to catch meconium and urine. In order to reduce the time of exposure the cord could be clamped and cut and then tied later after the premature baby had been in the bassinet for a short time. The temperature of the bassinet was kept at that point where it would hold the infant's temperature between 99° and 100° F. Often the temperature could be dropped from 96° F. to a point between 80° to 86° F. and this was sufficient to keep the baby's temperature at the proper level. A body temperature of less than 98.5° F. for a considerable length of time we considered more hazardous than a temperature over 100° F. All infants were re-

quired to maintain a normal body temperature without the addition of external heat before they were permitted to go home.

A very simple and rather inexpensive incubator was used (Figures 1 and 2). It consists of a white enamel wooden box, supported on four legs with roller casters. The box is twenty-seven inches long, twenty inches wide, and twenty-two inches deep. There are six small electric light bulbs at the bottom and a regular size newborn bassinet is suspended from the top. The light bulbs heat the air coming in through a vent in the lower part of the front of the box, and the heated air then passes upward against the bassinet, around the sides, and out of the top of the incubator. A cover with an opening fifteen inches long and nine inches wide can be lowered over the bassinet, to retain some of the heat. Very little difficulty was encountered in keeping the premature infants warm with this type of incubator, and the position of the baby at the top made it easy to feed and care for it.

The premature ward of the hospital in which the incubators were located was usually kept at a temperature between 78° and 82° F. A direct steam line gave the ward sufficient heat in the winter and assisted in keeping the relative humidity within a proper range. The humidity was held as much as possible between 50 and 60 per cent although during the very warm days of the summer it rose to 80 per cent for a short time.

Resuscitation was carried out in the incubator. It was always essential to remove any obstruction from the upper respiratory tract. Mucus was removed from the mouth and pharynx most effectively by aspiration with a soft rubber ear syringe or a soft rubber catheter attached to a syringe for suction. Great caution was always used in order to prevent damage to the mucous membranes of the mouth and throat. To remove mucus or amniotic fluid from the larynx, trachea, or large bronchi, the infant was held with the head lower than the body and the trachea and larynx were milked toward the mouth. Then suction was again applied to the pharynx.

If the premature infant failed to breathe properly after the removal of the obstructing material from the air passages, violent methods were not used, but instead the administration of oxygen with 5 to 10 per cent CO₂ was started at once.

In some cases the infant size Drinker respirator was tried, but the results were not very satisfactory. If the baby was cyanotic, inhalations of pure oxygen were of great value. A bottle of water with a short tube reaching to the bottom was connected between the tank and the funnel or catheter. The tank valve was regulated so that sixty bubbles a minute passed through the water. The oxygen was administered by means of a funnel or a small size catheter. The latter method was found to be the most satisfactory.

All infants in which an intracranial hemorrhage was suspected or known to exist received warm whole blood. It was injected into the deeper layers of the subcutaneous tissue and into the underlying muscle and was therefore not grouped or matched. The Wassermann test on all the blood used was negative. Usually 20 c.c. were given at one time once or twice a day. Occasionally this was repeated on the next day or two.

PREVENTION OF INFECTIONS

The prevention of respiratory infections and their complications was another important factor in the management of the premature infant. All premature babies should be kept in an environment which should be as clean as possible. In the hospital the infants were isolated. The nurses taking care of the babies did not have any other duties in the hospital. They kept a complete record of the condition of each infant. The temperature of the baby, the temperature of the bassinets, the weight of the infant, the amount of food given and regurgitated, the caloric intake, the fluid intake, and the number and nature of the stools were all recorded on a special chart. In this way the progress of the premature baby could be watched without entering the room each day to examine the infant. No one was permitted in the premature ward unless it was absolutely essential. A physician or a nurse was not allowed to enter unless a clean gown was worn and a mask was used to cover both mouth and nose. Any nurse developing an upper respiratory infection was dismissed at once from the premature service, no matter how slight her infection. Occasionally, in spite of all precautions, a baby did develop an infection with a moderately elevated temperature, a slight nasal discharge, marked diarrhea, and abdominal disten-

tion. This infant was at once placed in another room called the "septic nursery." Epidemics in the premature ward were often stopped by this procedure.

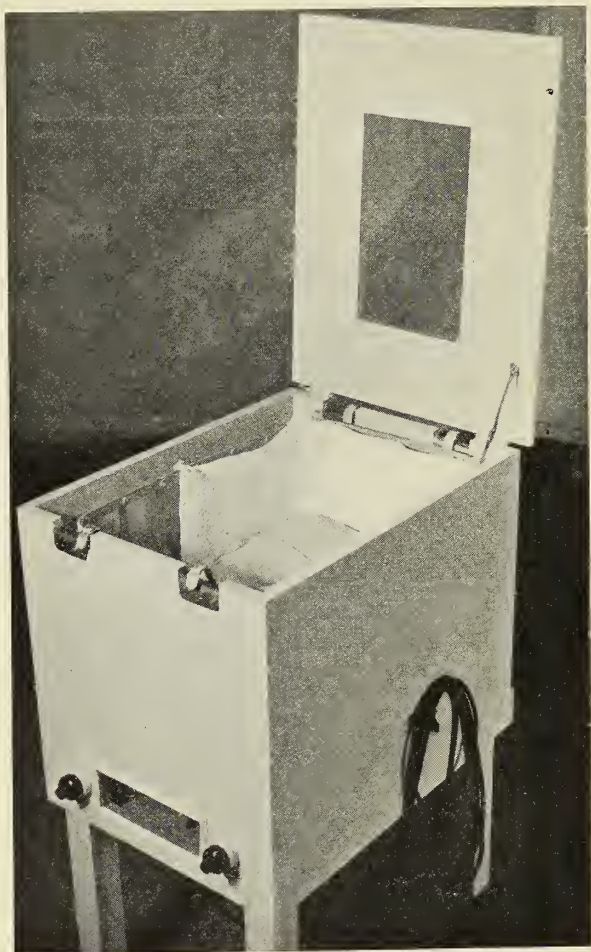


Fig. 2. Incubator showing position of newborn bassinets.

FLUID INTAKE AND FEEDING

The maintenance of a proper fluid intake and the use of a simple but efficient feeding were placed fourth in importance. It has been stated that the fluid intake for the premature infant should total about one-seventh to one-fifth of the body weight each twenty-four hours. By this is meant both the water and the milk given to the baby. The small gastric capacity and the low digestive capacity make the administration of water and the feeding of the premature infant a rather difficult problem. We have tried to supply the baby with a sufficient amount of fluid as soon as possible. Often therefore it was found highly desirable to give on the second and third

days of life 75 to 100 c.c. of sterile Hartmann's solution. This preparation contains sodium lactate, sodium chloride, potassium chloride and calcium chloride. It was given subcutaneously with the least amount of disturbance.

As far as the feeding was concerned, no attempt was made to reach the caloric requirements too rapidly during the first week of life. No gain in weight was expected. Over-feeding with its resulting long-continued feeding problems was thereby avoided. Boiled human milk was the food of choice but if it was not available a cow's milk formula was substituted. For the past year only one formula has been used. It consists of equal parts of unsweetened evaporated milk and water with the addition of three per cent dextrimaltose No. 1. This formula gave excellent results and was used interchangeably with the boiled human milk with no unsatisfactory outcome. In some instances the premature infants were started on human milk, changed to evaporated milk formula, and returned to human milk without any significant change in the weight curve.

The administration of the water and the feeding of the baby was simplified by the separation of the infants into three groups according to weight. The first group comprised the premature babies weighing 1,500 grams and less at birth, the second group those weighing between 1,500 and 2,000 grams, and the third group the infants weighing over 2,000 grams. With this division into three groups, a schedule which required that the babies of each group were to receive definite amounts of water and milk was prepared. On account of the fact that the statement has been made that no set rules may be laid down as to the volume of food which the premature infant of a given weight may be expected to take at a feeding, it was planned not to adhere too closely to the schedule, but it was found that only in a few instances was any modification necessary.

No water or milk was given to the babies for sixteen hours after birth. This was considered the rest period. It permitted the premature infant to become adjusted to the new environment. It allowed the physician and nurse to watch the baby for unfavorable signs such as irregular breathing, cyanosis, pallor, convulsions, and hemorrhage. Following the rest period the infant

weighing less than 1,500 grams received 10 c.c. of sterile water every two hours for four times. This completed the first day of life for the baby. On the second day the water was given every four hours and starting with 10 c.c. it was increased 2 c.c. with each administration. This was continued until 45 c.c. were given at a time. Then the water was decreased 1 c.c. each time it was offered until 30 c.c. were given. This reduction in water was made because the milk was gradually being increased. Milk was started on the second day beginning with 5 c.c. every four hours and increasing 1 c.c. with each feeding until 45 c.c. were given. If the baby regurgitated, no increase was made in the feedings until improvement took place. Interruption of the schedule did, however, occur in only a few cases. After the infant was taking 45 c.c. of milk satisfactorily at each feeding, further increases in the amount were ordered as necessary.

For the premature baby weighing between 1,500 and 2,000 grams, the sterile water was started and increased in the same way as for the smaller infant weighing less than 1,500 grams. An attempt was made, however, to continue to increase the water with each administration 2 c.c. until a total of 60 c.c. were being taken by the infant. Then it was reduced 2 c.c. each time to 30 c.c. The milk was started on the second day and increased 1 c.c. with each feeding until 60 c.c. were reached.

For the premature infant weighing 2,000 grams or more 15 c.c. of sterile water were ordered and given four times the first day. Beginning the second day, this was increased 2 c.c. with each administration until 60 c.c. were reached. The milk was started on the second day at 15 c.c. and increased 1 c.c. each feeding until 45 c.c. were being given. At this time the usual procedure was to decrease the water to 30 c.c. and increase the milk to 60 c.c. Additional changes were made as indicated. Our best test of an adequate amount of feeding was a steady gain in weight. We considered it, however, inadvisable to make daily weighings as this involved too much exposure. Our infants were weighed usually every two or three days.

The premature babies received the water every four hours and the milk two hours later every four hours. Two feeding schedules were followed, some infants doing better on one than

on the other. One schedule called for five water and five milk feedings, and the other five water and six milk feedings. The former schedule permitted the babies to have more rest but the latter schedule was often necessary when they did not remain quiet and appeared to want more food. This was especially true of the larger infants.

Feeding with a catheter was the most common method of administration of the water and the milk. All babies below 2,000 grams were fed by this method at once. A number 10 or 12 soft French catheter was used. The nurse was instructed not to pass it beyond a mark about 4 inches from the tip. The water or milk was permitted to flow into the stomach very slowly by gravity from a glass tube receptacle held about 8 inches above the mouth. The nurse was ordered to watch very carefully for any signs of regurgitation and when it did occur, the catheter was removed at once, the infant's head and shoulders lowered, and the face turned downwards. Refeeding in fifteen to twenty minutes was permitted.

In some instances feeding with the catheter caused quite a great deal of regurgitation. An ordinary medicine dropper, the tip of which was protected by a short length of narrow rubber tubing, was then tried. Small amounts of water or milk were allowed to flow into the baby's mouth, and, if the fluid was swallowed rapidly enough, the method proved satisfactory. Frequently, however, the infant only swallowed a small portion of the milk, permitting the remainder to accumulate in the pharynx with the danger of sudden aspiration pneumonia. The babies that did take the proper amount of water and milk by this method often consumed so much time in doing it that they received very little rest between feedings.

The Breck feeder, which consists of a glass receptacle with a small nipple at one end and a rubber bulb at the other, was found to be of value in some cases. The nurse by gently pressing on the bulb assisted the infant in obtaining in a rather short time all the milk through the nipple from the glass receptacle. When the Breck feeder was not used, a one ounce bottle with a very small nipple (transparent seamless teat of Ingrams, London) was tried with success. Later a larger bottle and nipple could be substituted with no difficulty. As has been stated above, the

nurse often could find out just what method of feeding gave the best results.

The premature infants were furnished with an adequate supply of the essential vitamins as soon as they were adjusted to their feedings. This was usually about the end of the second week of life, at which time all the babies weighing less than 2,000 grams were given five drops of viosterol each day. This was increased so that in many instances the infant received ten drops twice a day. Orange juice was also given, starting with 5 c.c. once a day and then changing later to 5 c.c. twice a day. The premature babies weighing more than 2,000 grams received cod liver oil of high vitamin D potency. One half teaspoonful was given at first once a day and then it was gradually increased so that the infant finally received one teaspoonful twice a day. The cod liver oil was added to the milk if the infant was fed by the catheter method, but it was given separately if the feedings were obtained from the bottle. The larger babies received 10 c.c. of orange juice each day and this was often increased to 10 c.c. twice a day. Yeast in the form of powdered brewer's yeast was not used routinely because it was our experience that it tended to cause frequent bowel movements and some distention.

Gastro-intestinal disturbances were given immediate attention. Regurgitation and vomiting demanded that there be no further increase in the feedings. In some cases the milk was concentrated by boiling and a smaller amount given each feeding. Diarrhea (frequent, watery stools) was dreaded a great deal. It occurred with and without any definite evidence of a parenteral infection. Nevertheless, the fluid intake was immediately increase by injecting Hartmann's solution subcutaneously. One-half strength Hartmann's solution or weak tea was given in place of the plain water by mouth. To the human milk one to three per cent casec (calcium caseinate) or dryco (powdered milk) was added, and from the evaporated milk formula, the dextrimaltose was dropped temporarily. If no improvement took place in twenty-four hours, whole blood was administered intramuscularly and the Hartmann's solution was again given subcutaneously. In many instances the response to this immediate treatment was very gratifying. Only the infants

with quite marked respiratory infections did poorly.

Occasionally after the diarrhea had cleared up, the premature baby appeared to be rather pale, and failed to gain in weight in spite of an adequate food supply. The hemoglobin was usually low and the injection of more whole blood subcutaneously (deep in the subcutaneous tissue) and intramuscularly assisted in raising the hemoglobin and in initiating a gain in weight. At the same time iron and copper were started. The infant received each day 2 c.c. of a 10 per cent solution of ferri et ammonii citras for each kilogram of body weight, and 1 c.c. of a 0.5 per cent solution of cupri sulphas. Both preparations were placed in the milk. The copper was usually discontinued after ten days of administration. Anemia was in general not a prominent clinical finding in our group of babies during their stay in the hospital and routine hemoglobin estimations were not made.

As soon as the premature infant's weight approached 2,500 grams, preparations were made to send the baby home. The mother who had retained her milk supply by regular expression of the breasts was asked to come to the hospital to nurse her baby. The mothers of the artificial fed infants were shown how to feed and prepare the formula. Instructions were also given concerning the administration of the viosterol or cod liver oil and the orange juice. If the baby continued to take an adequate amount of food from the breast or from the bottle and showed a steady gain in weight, no regurgitation and normal stools, he was transferred home. Here preparations had been previously made for the arrival

of the infant by the social service department of the hospital and the Infant Welfare Society of Minneapolis. Our experiences with the follow-up of the babies after discharge from the hospital will be recorded in another publication.

SUMMARY AND CONCLUSIONS

Our experience with care of the premature has indicated that there are certain basic principles to be followed:

1. Careful and intelligent nursing is essential.
2. Normal body temperature should be maintained from the moment of birth.
3. Infections, especially those of the respiratory tract, must be prevented.
4. A proper fluid intake should be maintained, and the diet should be simple but still adequate enough to supply the caloric needs without causing gastro-intestinal disturbances.

To the above may be added:

1. Resuscitation must be intelligently performed and no violent methods are permissible.
2. The nurse should sometimes be allowed to indicate which method of feeding may give the best results.
3. The premature infant must be furnished quite early with an adequate supply of the vitamins, especially vitamin D.
4. Injections of whole blood subcutaneously and intramuscularly are indicated when intracranial hemorrhage is suspected or known to exist, when there is a gastro-intestinal upset or a secondary anemia with or without evidence of infection, and when there is a failure to gain in weight in spite of an adequate food supply.

PAROXYSMAL TACHYCARDIA AND RELATED STATES*

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THE development of a new therapy always clarifies disease, helps to designate entities and blocks out overlapping and borderline conditions, both clinical and pathological. As an illustration, transference therapy for so-called primary anemias (Minot, Murphy, Castle, Damo-

shek, Roger Morris and others) has given a flood of light in terms of the physiologic complementary activities of the gastrointestinal tract on the one hand and the bone marrow on the other. There can be little doubt that we are on the verge of a development in direct bone marrow stimulants (Vitamin B² of Roger Morris or some modification of pentose nucleotide of Jackson and

*From the Duluth Clinic. Read before the Minnesota Heart Society in connection with the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 22, 1933.

confreres) which will influence profoundly bodily adjustments involving hematopoiesis.

Therefore, it is not unwise in approaching an analysis of periodic fast hearts to begin with quinine derivatives and see what their exhibition has taught us in terms of physiological perversions of the heart that have often been a great annoyance to both patient and doctor. The former has had little understanding from his doctor and the latter has fumbled around for explanations that rarely satisfied. Quinidine is likely not as popular presently as five years ago, particularly in the matter of the conversion to normal rhythm of cases of auricular fibrillation. This is due, of course, to the fact that the underlying organic pathology remains, and the prognosis is essentially unaltered in advanced rheumatic valvular disease or following the extensions of cardiovascular, coronary, or hypertensive disease. When, for example, a surgically remediable hyperthyroidism is in the background, the quinidine reversion to normal rhythm has an ideal exemplification.

We may proceed, therefore, to an analysis of functional disturbances of irritability and quinidine's propensity to prolong the refractory period of the heart, and find not only pleasing therapeutic responses but a means of coming to a fairer appreciation of troublesome breaks in cardiac rhythms that while offering essentially excellent prognoses invite great error in the immediate approach of the clinician or surgeon who is not "tuned in," as it were, to the possibilities. As an example: a well trained technical surgeon removed a diseased gallbladder. Three hours later the patient was found in what was believed to be profound shock: pulse small and even and a heart so rapid as to make counting of beats very difficult. After racing for three or four hours the tachycardia stopped as suddenly as it started. In the meantime, a good deal of footless anti-shock measures were taken, and, in fact, were continued when similar paroxysmal bursts of tachycardia supervened. Vomiting, that might have been limited by water balance or gastric decompression technic, continued, and in a short time an extrusion of viscera occurred; then an attempt at resuturing yielded a jejunal fistula and later years of invalidism. This man was later kept in equilibrium for three years with quinidine. It would seem fair to assume that had this entity been considered or a preoperative all in-

clusive study (anamnesis) been made, preventive therapy and less panic might have supervened, with greater credit to surgery in general. An adipose, menopausal woman of fifty-four has now been comfortable after quinidine therapy for four years after a harrowing exploit with "ptomaine poisoning." Soon after a bout with mushrooms she was rushed to a hospital and all hollow viscera that were approachable evacuated—gastric lavage, catharsis, diuresis. No one else in the family fell ill. She readily recalled having similar tachycardia spells before, but "shorter in duration." These experiences might be multiplied.

Other methods of treatment naturally include vagal pressure in the region of the carotid sinus, the Valsalva experiment, and drugs like physostigmin and pilocarpin on one hand or strophanthus or digitalis (intravenous usually) on the other. However, these and topical physiotherapy have largely yielded to the more gratifying use of quinidine sulphate or soluble quinine salts intravenously.

Thus, having established quinidine sulphate as a sovereign remedy in the prevention of classical paroxysmal tachycardia permit me to:

1. Leave out entirely an electrocardiographic evaluation of the source (auricular, ventricular, etc.) in the heart with the altered rhythms. Those who work with electrocardiographs would gain nothing by listening to me; those who do not are rarely handicapped by the lack
2. Mention the very common borderline group of tachycardias and their clinical features.
3. Make brief mention of the physiologic background, since within this field we gain the greatest light on the immediate problems and hope of improved therapy: a fertile field for surgeons especially to cultivate.

Regarding the normal sinus arrhythmia of youth with the persistent lability of pulse and the heart in neurocirculatory asthenia, the respiratory influence is dominant in the former, and fatigue, infection and excitement in the latter. The background of the thyroid influence is decided when real but admits of gross distortion in the hands of a surgeon who "accepts all high basal rates when present and negatives them when absent." The patient and science "get it in the neck."

Quinidine can be used in doubtful borderline goiter influence to help the clinician to make up

his mind. Paroxysmal tachycardia, bursts of premature contractions, even flutter or fibrillation, may be helped temporarily but not for long where true hyperthyroidism exists, *i.e.*, preoperative. Conversely, Lugol's solution yields even better immediate influence on rhythms but its benefit is also temporary. Varying both remedies back and forth, the while basal readings are sought, is peculiarly advantageous where questionable routine or substernal adenomata are under surveillance.

There remains a large and elusive group of inadequately poised folk who have various degrees of flights of tachycardia—not so decisive as to onset and abrupt termination as the textbook variety. Not a few of these react well to quinine, with the usual symptomatic adjuvants: barbitals, adequate diet, weight upbuilding, limiting of social loads and, of course, an exhibition of the psycho-therapeutic touch—the subtlest of the arts!

Finally, as to the physiology involved, surgeons particularly are prone to incriminate the heart and load upon it the iniquity of a rising pulse rate, on and off into fatality, all based upon the totally erroneous assumption that the tachycardia involved is due to some primary fault within the heart muscle itself. Illustrations again suffice for argument.

The body's circulatory needs are proportioned by the oxygen and energy-yielding pabulum requirements of its cells. The minute volume output of the heart and its relation to the oxygen consumed and CO_2 produced is one of the most fundamental of bodily adjustments (Haggard and Henderson).

The minute volume output and the cardiac systolic emptying are primarily dependent upon sufficient diastolic filling and adequate return of venous blood to the ventricles from the great veins.

An increase in the heart rate is always secured at the expense of diastole. Anrep's thesis that the coronary suffusion of the heart occurs mainly in diastole, plus a short interval at the beginning of systole, is very illuminating, and has decisive clinical connotations. Exophthalmic goiter and paroxysmal tachycardia (Levine-Willius) can produce angina pectoris quite indistinguishable from the true Heberden type for obvious reasons—an overexpenditure of energy in the heart spurred on by a situation the equivalent of

forced exercise. Pernicious anemia and insulin reactions have copied the same results for slightly altered reasons: inadequate oxygen-carrying capacity of erythropenia and too abrupt withdrawal of the glycogen available for the heart muscle fibers. In fact, in certain coronary-damaged hypertensives hyperglycemia may be compensatory.

The minute volume output is only moderately increased by heart rates up to 90 to 110; when 160-80 is attained the output markedly drops. Such is the importance of diastole venous return and a study of various situations that may suddenly supervene to give a false impression that we deal with heart failure despite the fact that with cyanosis and pallor the ever questioned "cardiac dilatation" is suspected. Dependence is placed upon drugs like digitalis, caffeine, camphor, adrenalin, not to mention strychnine and whisky. Quinidine is a specific for angina occurring in spells of paroxysmal tachycardia.

One of the most dramatic of the states which I have seen where the tachycardia is obvious, has been the status (usually post-operative) of massive atelectasis of the lungs, and the conditions accompanying shock which Zwingle and Pfeiffer and others of the Princeton school attribute to suprarenal cortex inertia and an inability of the organism to maintain circulatory blood volume by prompt and easy dilution from non-circulating serum. Thus, they say that eschatin by hypodermic promptly restores blood volume and with it diuresis and checking of azotemia. The rôle of all excessive hemorrhage is readily sensed, as well as the advantage of transfusions of blood and the large molecule gum arabic solutions.

A neat confirmatory observation has come to hand from Walters of the Mayo Clinic, who found, after a bile leakage to the right subdiaphragmatic space, a presumed torsion of the cava inferior, with a burst of tachycardia, that responded at once to the bile evacuation. Then, dog experiments were made with a blowup rubber glove introduced into a like position: torsion would repeatedly incite the same sequence. It may be recalled in this connection that the diaphragm has been called "the second most important muscle in the body." Its function as a circulatory pump to create a chest vacuum and unload the liver (laden with blood) has not been

appreciated. Clinical medicine eagerly awaits easier and more definite means of registering venous pressures. Standards must be set not only for normal but pathologically damaged hearts. These latter must suffice for the enormous percentage responses in stroke volume and energy output required from repose to forced athleticism. The heart is not an especially efficient

pump—said to be at best but 25 per cent. Please remember that infections like pneumonia and operations like cholecystectomy may impose upon a heart a handicap (aside from infection) as great as extreme exertion. Thus, I have reversed the usual process: I have begun with dogmatic empiricism and finished with philosophical exhortation.

PSYCHONEUROSES*

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THESE lean years, with their trials, failures and discouragements have taxed the stamina of everyone, and, like all conditions which cause prolonged emotional stress, have produced an abundance of nervous disturbances in many people.

What has been the nature of these disturbances? Although there is a certain amount of contagious mimicry at play, the character of the emotional experience seems to influence, to some extent, the symptoms which neurotics display. For instance, fear is linked in the minds of most people with trembling. We speak of fear and trembling, and we also speak of being paralyzed with fear. Therefore the predisposed neurotic, subjected to prolonged fear, might conceivably develop tremors and paralysis. Such gross psychoneurotic symptoms were frequently encountered in the years 1916 to 1920, and among the soldiers were dignified by the name shell shock. These dramatic and interesting hysterical manifestations have almost disappeared, and in their place we see the gloomy, apprehensive countenance of the victim of financial distress.

Shell shock has gone, but we have the depression dumps.

In many respects, the present-day psychoneuroses are more difficult to deal with than those which preceded them. The instability of business and the uncertainty of jobs result in prolonged anxiety which creates the present day emotional stress. If, as the result of the failure of his business, or repeated cuts in income, or

the loss of his position, a man develops a psychoneurosis, he, in addition to the problem of maintaining himself, sufficiently disturbing in itself, must also combat an harassing sense of defeat or failure, for a very real part of these nervous disturbances are the feelings of inferiority, the sense of defeat, the loss of assurance and self-confidence.

The symptoms which psychoneurotics show vary to some extent with the individual, but a common inciting cause leads to a certain similarity. At present many of them are gloomy and depressed. Many of them are anxious and apprehensive and display an aimless energetic restlessness. Anxiety states are frequently seen. Among the conversion hysterics the physical symptoms seem to be in keeping with the worried state of mind which is so common today. Tachycardia, extrasystoles, precordial oppression, loss of appetite, nervous indigestion, nausea, diarrhea and psychic impotence seemed to have occurred frequently in the last year.

From what has been said, it might be inferred that the symptoms of the neurotic are the result of a suggestable state of mind; that the neurotic is merely a victim of his imagination and not really sick. Quite the opposite is true. Any person so affected is definitely sick and his suggestability is due to his sickness, and no matter how irritating he is, or how much he tries the patience of the physician, he should be thought of as being ill, and given proper care. To do this intelligently, we must not only know something of the dynamics producing the neurosis but we must also study the problems and character of the patient. Of course, the first step to this end is to recognize the type of the disorder.

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The neuroses are to be distinguished from the psychoneuroses.

The actual neuroses are:

- Anxiety neuroses
- Neurasthenia
- Hypochondria
- Traumatic neuroses.

The psychoneuroses are:

1. Hysteria
 - a. Conversion hysteria
 - b. Anxiety hysteria
2. Compulsion neuroses (obsessions).

The distinction which is drawn between the neuroses and the psychoneuroses according to psychoanalytic doctrine is this: The neuroses have a physical basis, while the psychoneuroses are entirely confined to the mind. The actual neuroses are characterized by real changes or disturbances in the physical aspect or physiological functions of the organs of the body. In the psychoneurosis there is no such change; it is a purely psychic condition.

The psychoanalytic concept of the psychoneurosis may be summarized thus:

1. When an adult meets an environmental obstacle (such as the financial difficulties of today) which he cannot surmount, and when he cannot find it within himself to pardon his failure to surmount it, he withdraws his thoughts from the realities of the world and begins to live in a "make-believe world" of his own building.
2. In this "make-believe world" or phantasy his thoughts move backwards to some period preceding the one in which he encountered the obstacle, usually back into infancy, in which state he remembers no trials, and the expression of a wish brought about its fulfillment.
3. The psychoneurosis is considered a repetition of infantile situations. Whether these situations are recalled because they are pleasant, whether they are dwelt upon because at that period there was an especial love for some particular member of the family, or whether there was some incident of a real or imagined traumatic character which dammed up the love interest at that point, seems to be something about which opinions differ, but it is generally conceded that the seat of the pathological process is in the love interest of the affected person; that it is in the sexual sphere. The backward moving phantasy of the neurotic is always toward an

early phase of some mental aspect of his love life.

With this brief classification of the psychoneuroses and this sketch of the theory of their development it may be further said that the principal difference between the actual neurosis and the psychoneurosis lies in the fact that in the neurosis there is little or no tendency to develop the reminiscent phantasy, while this phantasy is the gist of the psychoneurosis. However, it is not the purpose of this paper to theorize as to the production of these conditions. It is far more pertinent and practical to discuss the application of some of the helpful features of psychoanalytical technic which may be usefully applied by anyone interested. Ideally of course the psychoneuroses are best handled by a psychoanalyst. As this is not always possible the following are some useful hints gleaned from their method of management.

One extremely important factor in handling neurotic patients is to make them like you. If this can be managed, it immediately offers you an immense aid in your task. For it is then easier for them to confide their conscious difficulties to you, and thereby get rid of some of their pent up emotion. If they like you it makes them want to carry out whatever changes in habit of thought and manner of living you may think important. Because of your liking for him, and personal interest in him, the patient feels under a friendly obligation to obey your orders, for fear of losing your respect, interest or good opinion.

It is not possible to describe how to make the patient like you, but some negative suggestions may prevent any serious faults in the attitude of the physician.

It is important not to preach or to moralize and generally it is of no avail to tell them what you consider to be the cause of their difficulties. You should not nag, find fault, belittle or poke fun at their trouble. It is usually better to hint at any changes thought necessary, rather than to give specific directions. Care should be taken not to confuse the patient by giving him too many suggestions. One thing seen clearly is worth more to him than a host of things not clearly perceived. The physician should be on the alert to recognize and encourage every successful effort of the patient to do what has been suggested.

Supposing that the physician has succeeded in establishing friendly relations between himself and the patient, and that the patient has confided his conscious difficulties to him, is that enough? No, for that is a mere beginning. It is common knowledge that anyone may know the things and circumstances that are making him nervous, but this does not help the nervousness or help the mental state which accompanies it. Knowing the cause does not effect a cure. For this, it is necessary to bring about certain changes in his habits of thought, outlook on life, manner of living and love life.

In using the psychoanalytic technic in order to accomplish these changes it is necessary that the patient resume his habitual phantasy, which he will invariably do, if his mind is permitted to idle. The psychoanalyst gives the patient the opportunity to do this in the course of his treatment, in order that he may gain insight into the patient's unconscious difficulties, and the faulty methods used by him in his efforts to overcome them. Moreover, the suggestable state of mind of the patient makes it possible to convince him more forcibly that he has divulged certain things to the physician which call for changes in view point, and the substitution of good habits for bad ones.

It is possible, however, with some neurotic patients to accomplish the same result by persuading them to try the change. If the change gives them relief, they are convinced of its value. For example, most neurotics are introspective. Their interests are narrow, and they shun social intercourse. They shun their friends not only because their interest is concentrated in themselves, but also because they are conscious of being peculiar and fear that their friends will notice it. If their reluctance can be overcome, and they can be persuaded to meet their friends, with pleasant results, this agreeable experience exerts a reassuring effect upon their apprehension. They can probably be persuaded to repeat it, and eventually normal social interest is re-established, and the habit of introspection diminishes.

Many psychoneurotics complain of physical symptoms which in some cases seem real enough to demand treatment, but since one of the characteristics which we wish to combat in these people is their tendency to look upon themselves

as invalids, undue emphasis should not be placed upon any physical symptoms they may exhibit, nor upon measures designed to relieve these symptoms. The emphasis should be placed upon the necessity for change in mental outlook. Their invalidism frequently includes some derangement of their sexual functions, and it is often advisable to adjust their outlook in this respect.

This is a task which requires understanding and tact, and of course this is the phase of analytical work which has caused so much unfavorable criticism.

In the minds of many physicians this delving into the sexual sphere may seem obnoxious as well as purposeless. Therefore, it may be well to point out how the sexual phase of the condition is connected with the production of symptoms, for example, in the anxiety neurosis which clinically and in its mental symptoms is very closely akin to anxiety hysteria.

The disturbance is characterized by periods of intense apprehension, fear and anxiety from no apparent cause. These may come on at any time of the day or night, they may waken the patient from sleep, and be accompanied by a fast heart rate, sweating, nausea, diarrhea, dizziness and various other signs of panic and shock. They are described by the patient as intense fear of an impending calamity, fear of death, fear of losing his mind, or various other catastrophes. Actually such attacks of anxiety may be due to a long continued excitation of the sexual impulse without normal gratification, or they may be due to enforced or voluntary restraint which is poorly sustained by the individual.

Anxiety states have been described by Freud as occurring in widowhood, among young married women who fear pregnancy and consequently have all gratification thwarted; in women whose husbands are feeble sexually; in young virgins, and in women who are frigid or anesthetic. In men anxiety may arise from undue erotic stimulation, from long courtships without satisfaction or from prolonged abstinence which they are unable to tolerate.

The above instances of some of the sexual derangements which cause anxiety states are mentioned because the cause and effect seem to be so direct. Whenever it is possible to adjust the sexual difficulty without transgressing the social code, the symptom of anxiety disappears.

The importance of adjusting sexual matters should therefore be apparent, however unpleasant the task may seem to the physician.

At the beginning of the paper we referred to the sense of failure, lack of assurance and loss of aggressiveness and courage, now so prevalent. These states of mind are often met with as the accompaniment of a nervous disturbance, the

psychoneurosis. As they are an integral part of the nervous state, no special effort should be put forth to deal with them, directly, for as the nervous condition is cured, a more vigorous and healthy attitude toward the problems of life is resumed.

And this paper has been an attempt to indicate briefly a plan for effecting this cure.

CASE REPORTS

CONGENITAL ANOMALY OF KIDNEY, URETER AND BLADDER*

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Congenital anomalies of the urinary tract are more common among children than among adults. This is due to the fact that many of these anomalies tend to shorten life. Adequate articles on the subject have been written by Bigler and by Hurt. Bruce recently reported a case of anomalous hydro-ureter and gave references. Some other, equally valuable, articles are not mentioned here because they easily can be found by following through the leads given by the authors just named.

Other data that cannot be found in the manner mentioned will be reviewed briefly. Kass studied reports of postmortem examinations of newly born and stillborn infants as well as another series of reports, excluding newly born and stillborn infants, and considering children to the age of fifteen years (Tables I and II). Rovsing stated that in a third of cases of hydronephrosis of children the condition was congenital. In Epstein's series of thirty-three anomalies found in the course of 1,000 postmortem examinations, double ureters were present in ten cases; in six they were unilateral, and in four bilateral. In five cases the pelvis was double, in three unilateral and in two bilateral. Lanman and Mahoney noted ten cases of double ureter in 234 consecutive cystoscopic examinations of infants and children. Bilateral duplication of the ureters occurred only in one case. Fishberg reported the case of a child aged nine years, who had hypertension and cardiac hypertrophy, hydroureter and hydronephrosis due to an obstructing valve in the urethra.

All authors urge thorough urologic examination of children with urinary trouble. Intravenous urography in some cases is an excellent diagnostic aid. Renal and ureteral duplications may be unilateral or bilateral, complete or partial, or a combination of the unilateral types in the same person. The ureteral orifices are generally situated close together, and at approximately the normal site in the trigone. Occasionally, however, they are so placed in the bladder that their discovery may be difficult. Often catheters can be passed into each ureteral orifice, specimens obtained for the usual examination, and functional tests performed for estimation of function of the separate segments of each kidney.

*From the Mayo Foundation. Work done in the Department of Pathology, University of Minnesota, and in the Minneapolis General Hospital.

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TABLE I. NEPHROPATHY IN NEWLY BORN AND STILLBORN INFANTS DISCOVERED BY KASS IN REPORTS OF 1,000 CONSECUTIVE POST-MORTEM EXAMINATIONS

Malformation	Cases	Sex	
		Male	Female
Horseshoe kidney	7	5	2
Cystic kidney	11	7	4
One kidney absent	4	2	2
Double pelvis	3		
Unilateral	1		1
Bilateral	2	1	1
Hydronephrosis	9	4	5
Anomalous position	2	1	1
Hypoplasia	2		2
Total	38	20	18

TABLE II. NEPHROPATHY IN CHILDHOOD EXCLUDING THOSE IN TABLE I AND INCLUDING PATIENTS UP TO FIFTEEN YEARS OF AGE, DISCOVERED BY KASS IN REPORTS OF 1,100 CONSECUTIVE POST-MORTEM EXAMINATIONS 1923-1931

Malformation	Cases	Sex	
		Male	Female
Horseshoe kidney	3		3
Cystic kidney	6	4	2
One kidney absent	3		3
Double pelvis	2		2
Unilateral	1		
Bilateral	1		
Hydronephrosis (congenital)	7	4	3
Anomalous position	4	2	2
Hypertrophy	1		1
Total	26	10	16

The embryologic development of urinary anomalies has been reviewed by Helmholtz and Amberg. Wide variations in developmental defects occur in the genito-urinary system because of the formation of three successive types of excretory organs, pronephros, meso-

nephros, and metanephros from the nephrogenic cord. Portions of each atrophy and disappear. The metanephros, which arises as a bud from the terminal end of the Wolffian duct, elongates and splits to form the ureter, pelvis and primary and secondary calices as well as the collecting tubules. Premature or exaggerated division causes varying degrees of partial duplication of the pelvis and ureter. Complete duplication of the pelvis and ureter down into the bladder occurs if there is a coincident primary branching at the point of deviation of the renal bud from the Wolffian duct.

Braasch demonstrated that when a double pelvis occurs the lower pelvis is larger and more completely formed. The upper is smaller and rudimentary if the pelves are distinct. Occasionally, there is a communication between the pelves. Complete duplication of the pelves of both kidneys is rare. In complete duplication of the ureters they cross twice before entering the bladder, once below the ureteropelvic juncture and again above the vesical wall. The ureter of the lower pelvis enters the lateral and posterior meatus, while the ureter from the upper pelvis enters the mesial and anterior meatus. It is rare for ureters to fuse on crossing, and more rare for one ureter to cross the bladder.

REPORT OF A CASE

A colored girl, aged four months, was admitted to the hospital September 7, 1931. She was a firstborn, full-term baby, and had been easily delivered. The family history was irrelevant. The infant was breast fed and had had good health except for an attack of diarrhea of three days' duration during the third month of life. Fourteen hours before admission the child became restless and cried at short intervals. Movements of the bowels had been satisfactory the day before, but there had been none on the day of admission. Shortly after breast feeding in the morning, she had vomited a small amount of brownish fluid. Thereafter, the mother thought, the child had become pale and weak.

The child appeared to be in shock. The skin was pale and cold. Respirations were labored but not rapid, and there was an expiratory grunt. Cyanosis was not noted. The temperature was 97° F. The pulse rate was 100 beats a minute. Development and nutritional status were excellent. Two teeth were in early eruption. The abdomen was slightly distended. Tympany was increased. There was no rigidity, and masses were not palpated. Borborygmus was heard. However, the child seemed to give indication that the abdomen was diffusely tender on palpation.

A roentgenogram gave evidence of no abnormality in the thorax, but there was a marked accumulation of gas in the stomach and small bowel.

Urine was not passed until ten hours after admission, when 15 c.c. was obtained by catheterization. It contained a trace of albumin and 20 pus cells. Spinal fluid was under slightly increased pressure. Leukocytes numbered 14,000 in each cubic millimeter of blood; the percentage of polymorphonuclears was 77, of lymphocytes 21, and of monocytes 1.

Laparotomy was performed under general anesthesia on the day of admission. Nothing abnormal was noted. Later, several transfusions of 25 c.c. of whole blood were given. After the operation and catheterization, the urine was passed in fairly large quantities. The following day signs of pulmonary consolidation developed. The temperature rose to 103° F. and the child died September 9.

Necropsy.—The body was 59 cm. in length, and weighed about 12 pounds (5 kg.). There was moderate cyanosis of the lips and fingernails. The right lung weighed 60 gm. There was an irregular consolidation in the posterior portions of the upper and lower lobes. The external and cut surfaces in these regions were dark and mottled, and purulent fluid could be expressed. The left lung weighed 50 gm. It showed

changes similar to those seen in the right lung but of lesser degree.

The kidneys were removed with the ureters and bladder in one piece. The entire specimen weighed 59

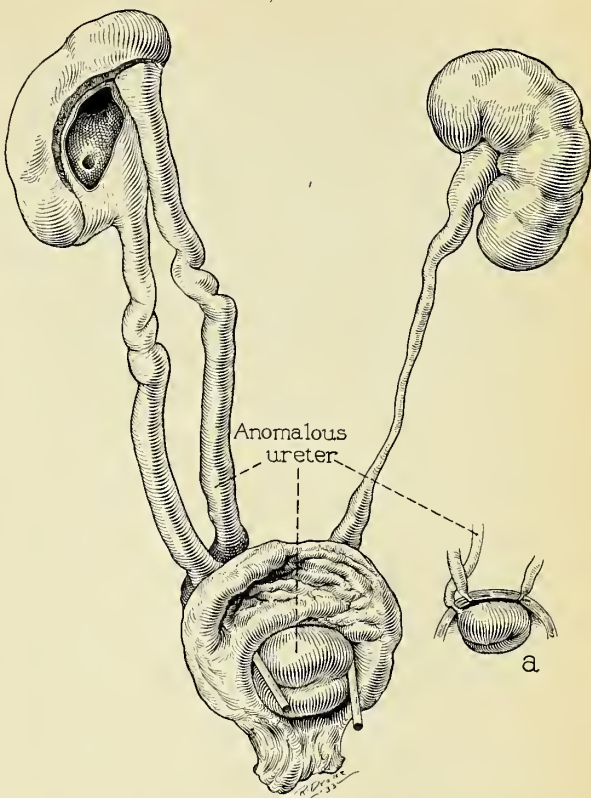


Fig. 1. The superior accessory ureter of the right kidney ends in a blind sac in the region of the trigone where it compresses the orifices of the normal ureters.

gm. (Fig. 1). The right kidney, which weighed 11 gm., was considerably smaller than the left and appeared sac-like. Its wall was thin (2 mm.) and the central part was composed of two pelves, the largest of which was situated inferiorly. Both of these cavities contained urine but they did not communicate with each other. The ureter issuing from the lower pole was dilated (7 mm.) but had a fairly free opening into the bladder, for urine could be expressed from it. The ureter which arose from the superior portion of the kidney was also distended, and injection of additional fluid and pressure on the ureter failed to reveal an outlet to the bladder. When pressure was exerted, a large, bulbous elevation appeared in the trigone (2 by 2 cm.) which was the blind inferior portion of the superior right ureter. On distention this bulbous elevation was so marked as completely to occlude the orifices of both ureters.

The left ureter was also dilated (7 mm.). Urine could be expressed on pressure. The left kidney weighed 27 gm. Its pelvis, although dilated, was smaller than that of the right kidney. The vesical mucosa was slightly hemorrhagic in its posterior portion. There was no sloughing or trabeculation. Its wall was 5 mm. thick. The urethra was without evidence of stricture. The organs of the head and neck were not examined.

The value for urea nitrogen was 86 mg. in each 100 c.c. of blood at necropsy. Culture of the urine from the pelvis of the left kidney and of that from the right inferior pelvis revealed Gram-positive and Gram-

negative bacilli and diplococci and also streptococci in short chains and staphylococci. Culture of the fluid within the bladder revealed the same organisms as well as staphylococci. The urine in the anomalous ureter and pelvis gave no growth.

SUMMARY

Complete duplication of the right ureter and right renal pelvis with the abnormal ureter ending in the wall of the bladder formed a sac which filled with urine eventually, impinging on the normal ureteral orifices to such an extent that bilateral hydro-ureters and hydronephrosis occurred. Pyelonephritis and renal insufficiency resulted.

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ABDOMINAL ACTINOMYCOSIS

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Abdominal actinomycosis, although not a rare condition, always presents some difficulty in diagnosis. Sanford and Voelker, in 1925, reviewed the authentic cases of actinomycosis in the United States, which numbered 670. Actinomycosis of the abdominal wall and cavity with its viscera made up 18 per cent of the group. They concluded that the disease was one of young adults, although the youngest patient in their series was aged twenty-eight years and had an abscess of the lung, and the oldest was eighty-two years of age with involvement of the thorax. The condition may be acute, subacute, or chronic. The shortest illness lasted one week and the longest fifteen years.

Good in a review of the cases of abdominal actinomycosis seen at the Mayo Clinic found 77.5 per cent to be definitely primary in the appendix and an additional 13 per cent in which the appendix was the most logical primary site of infection. Thus a total of 90 per cent of his cases started in the region of the appendix. He explained this on the basis of stasis in the ileocecal region.

In the Duluth Hospitals there is recorded only one case of appendiceal actinomycosis which was proved by necropsy. There are also two or three clinical cases which are no doubt true conditions of this type. The following case is reported because of the unusual clinical course, lack of external sinuses, absence of cuta-

neous lesions late in the disease and diagnostic confusion.

REPORT OF CASE

A white female, aged eighteen years, was admitted to St. Luke's Hospital April 24, 1933, with the chief complaints of a dull aching pain in the right side of the thorax, cough productive of blood-tinged sputum, loss of weight of 2 or 3 pounds in the last six months, anorexia, and pallor. The pain in the thorax and the productive cough had been present for about five months. The family history was essentially negative. The patient had always lived in the city and there was no history of contact with tuberculosis. The past history revealed a mild attack of inflammatory rheumatism in 1923 and a ruptured appendix in July, 1929. At operation an abscess in the right lower quadrant had been drained. There was slight general peritonitis. The wound healed slowly but completely in about eight weeks after a small abscess adjacent to the wound had been opened. Following this, the patient felt well and had no complaints whatever; she attended school, carried on her usual activities and had required no medical attention. May, 1932, three years after the operation, she consulted a physician because of some undue weakness and pain in the right side of the thorax of short duration. Examination showed evidence of fluid in the right side of the thorax and hemoglobin of 55 per cent. A small amount of clear fluid was aspirated from the chest; inoculation of guinea pigs for tuberculosis proved negative. The patient was given iron and ultraviolet light treatments and made an excellent response to this treatment so that in September she felt well. In December, however, the hemoglobin was 50 per cent again, although the patient felt fairly well. In the latter part of December a cough with bloody sputum began which persisted especially at night.

In January, 1933, the patient was seen by Dr. Laird of Nopeming Sanatorium. The thorax was practically negative on examination, the Mantoux test was negative and the roentgenograms of the thorax showed no evidence of tuberculosis. In March chills, fever, sweats, anorexia and pain in the right side of the thorax began.

Examination on admission to the hospital in April showed a poorly developed, undernourished, pale and anemic girl. Examination of the chest suggested the presence of fluid at the base of the lungs. No râles were heard. The spleen was slightly enlarged and palpable. Shifting dullness was present in the flanks which evidenced free fluid in the peritoneal cavity. Roentgenograms of the thorax showed some parenchymal infiltration in the apex of the left lung and increased density at the base of the right lung which suggested pulmonary tuberculosis.

The laboratory findings showed erythrocytes numbering 3,110,000 and leukocytes 16,200 in each cubic centimeter of blood. The differential count was polymorphonuclears 79 per cent, lymphocytes 20 per cent, and eosinophils 1 per cent. The hemoglobin was 58 per cent (Dare). The sputum was negative for tubercle bacilli on numerous occasions. Urinalysis showed albumin, graded 2, and a few leukocytes to the high power field. Blood culture was negative on two occasions. The blood urea was 20.3 mg. in each 100 c.c. of blood.

Aspiration of the thorax was attempted twice but no fluid was obtained. An abdominal paracentesis was done and 250 c.c. of clear straw colored fluid was removed. The cell count of the fluid was 370 with 70 per cent erythrocytes and 30 per cent leukocytes; no organisms were demonstrated on a smear. The guinea pig inoculation was negative for tuberculosis.

Clinical course and diagnostic suggestions.—The severe secondary anemia, high leukocyte count, sputum negative for tuberculosis and negative Mantoux test were thought by Dr. Laird to rule out tuberculosis.

*From the Arrowhead Clinic.

Polyserositis and lymphoblastoma were suggested early as possible diagnoses, as was abdominal malignancy. Splenic anemia and all splenic-hepatic syndromes were thought to be ruled out because of the septic course.

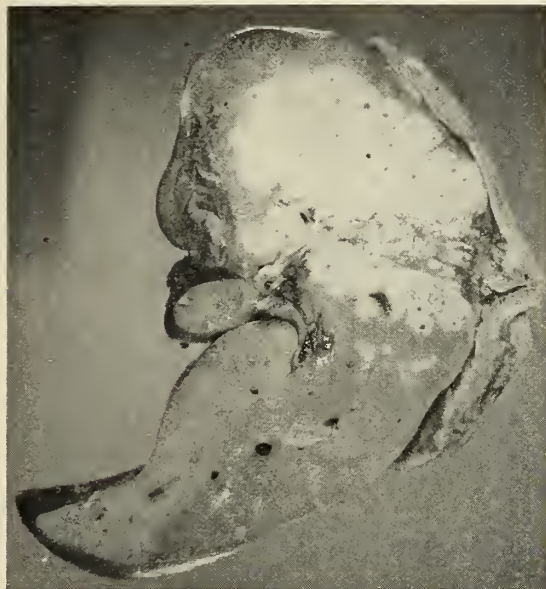


Fig. 1. Large honeycombing actinomycotic abscess in the right lobe of the liver with small abscess in the left lobe.

Roentgenograms of the thorax on May 13 showed no apparent change. The patient's clinical course ran slowly down hill; the abdominal fluid recurred; diuretics and paracentesis were required for relief. Severe chills and fever continued daily throughout the hospital course. In the last two weeks of life generalized muscular twitchings began and terminally severe convulsions occurred, one of which resulted in death August 26, 1933.

The erythrocyte count varied from 3,440,000 to 2,640,000 and the leukocyte count from 17,400 to 10,500 for each cubic centimeter of blood, and the blood sugar from 136 to 120 mg. per 100 c.c. The sputum was cultured and showed only staphylococci. No fungi were demonstrated. The blood calcium was 6 mg. per 100 c.c. during the period of muscular twitchings. All agglutination tests were repeatedly negative for typhoid, melitemia, and tularemia. The sedimentation rate was markedly increased.

Necropsy.—The body was markedly emaciated and showed an old appendiceal scar. There was beginning sacral decubitus and some petechial lesions on the neck and the upper part of the chest. The abdominal cavity contained 2,000 c.c. of yellowish serous fluid. The omentum was adherent to a mass in the right side of the pelvis which included the cecum, right tube and ovary. The heart, which weighed 175 gm., showed nothing of note. The right half of the diaphragm was very adherent to the liver. The lungs contained dense pleural adhesions and no fluid. In the outer parenchyma of the lungs were many small abscesses which measured from 1 mm. to 1.5 cm. in diameter. The abscesses contained a yellowish caseous material. The spleen weighed 390 gm. and contained a small abscess measuring 1 cm. in diameter. The kidneys weighed 300 gm.; the right kidney contained an abscess 3 cm. in diameter at the upper pole and the left kidney a similar abscess 1.3 cm. in diameter. The mass in the right side of the pelvis containing the cecum and right adnexa uteri and omentum was densely adherent. There was a fistulous tract from the appendix into the right

tube, which was blocked at both the uterine and fimbriated ends, and contained small fecal particles. In the dense surrounding tissue were three or four small abscesses about 5 cm. in diameter.

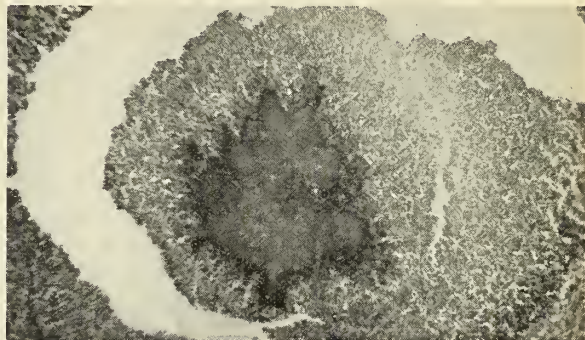


Fig. 2. Section of abscess in the liver showing a typical actinomycotic granule.

The liver on cross section was found to contain a large honeycombing abscess about 9 cm. in diameter, as shown in Figure 1, which filled almost the entire right lobe. The left lobe contained small miliary abscesses. The remaining abdominal viscera showed nothing of note.

The gross pathologic diagnosis was: (1) primary actinomycosis of the appendix with metastatic abscesses in the liver, spleen, lungs and kidneys (the brain was not examined); (2) splenomegaly; (3) hydroperitoneum; (4) omental and peritoneal adhesions of the appendix, cecum and right adnexa with fistulous tract into the right salpinx; (5) pleural adhesions, and (6) emaciation. A fresh smear of the pus from the hepatic abscess showed actinomycotic granules. Microscopic section of the abscess in the liver (Fig. 2) showed a typical actinomycotic granule.

SUMMARY

This case is of unusual interest because of the absence of fistulous tracts in the appendiceal area, the three years of apparent good health after surgical treatment, the absence of terminal cutaneous manifestations and the failure to diagnose the condition before necropsy.

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MASSIVE COLLAPSE AND POSTOPERATIVE ATELECTASIS*

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THE term "massive collapse" was chosen by Pasteur to denote extensive pulmonary atelectasis, and he is accredited with the first clinical recognition and description of the findings in this condition. However, as far back as 1829, Louis noted areas of airless pulmonary tissue in the lungs of children dying from typhoid fever, and to this condition he applied the name "carnification." In 1832 Jörg observed incomplete pulmonary aeration in newborn infants persisting from

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fetal life, and referred to this condition as "atelectasis." In 1890 Pasteur published his observations on various degrees of pulmonary collapse, the result of diaphragmatic paralysis associated with diphtheria. From that date and until 1914 he wrote rather extensively on the condition occurring as a sequela of various diseases,

all cases of massive collapse. The following case is reported because the series of roentgenograms portrays very well the succession of events that occur during the presence of and following the removal of the bronchial obstruction in a case of postoperative massive collapse.



Fig. 1. March 14, 1933. Massive collapse.



Fig. 2. March 16, 1933. Resolving atelectasis.

injuries to the wall of the thorax, and as a complication of abdominal surgical procedures. He referred to it as "massive collapse" or "active lobar collapse." However, in 1907, Barr first reported on massive collapse of the lung as a postoperative complication.

In 1845 Mendelssohn produced massive collapse experimentally by occluding the bronchi, and in 1897 Lichtheim showed that massive collapse resulted from the removal of air from the alveoli by the blood stream following obstruction to the bronchi. This was shown more conclusively, in 1930, by Coryllos and Birnbaum by gas analysis of the air in the alveoli and the perialveolar capillaries.

As an army medical officer in France during the World War, Bradford observed massive collapse associated with various types of gunshot wounds, and he mentioned that the confusing findings in wounds of the thorax are not always due to hemothorax, but to the massive collapse. In many cases the wounds did not perforate the pleura and yet collapse occurred. In other cases, the collapse occurred on the side opposite the wound in the thorax, and he referred to this as "contralateral collapse." He also observed that massive collapse was not infrequently associated with wounds of the pelvis and buttocks.

In 1927 Wilson reported having noted markedly increased negative pressure in the intrapleural space in cases of massive collapse, and as a practical application of this finding, Habliston, in 1928, relieved the distressing symptoms of the condition in four cases by developing an artificial pneumothorax. He strongly advocated the artificial production of pneumothorax in

REPORT OF CASE

A man, aged twenty-one years, was operated on March 11, 1933, for repair of a right inguinal hernia. During the first two days after operation the temperature remained about 100° F., the pulse was slightly elevated, and there was some coughing. About 4:00 p. m. March 14, there was a rise in temperature to 102° F. and a corresponding rise in the pulse rate. The cough became more troublesome, and more productive. The patient became apprehensive, somewhat restless, and experienced rather severe pain in the right side of the thorax during respiration, and especially when coughing. His face was flushed and his distress was very apparent. Moderate dyspnea was present.

It was noted on examination that expansion of the right side of the thorax was much less. There was decreased resonance to percussion over the entire right side, and the heart was displaced to the right. Dullness at the right base suggested elevation of the diaphragm. Tactile and vocal fremitus were markedly decreased. Auscultation disclosed a decrease in intensity of breath sounds. A diagnosis was made of massive collapse of the right lung, and oxygen therapy was instituted immediately.

From a roentgenogram of the thorax (Fig. 1) at this time a diagnosis was made of massive collapse; it was noted that the right side of the diaphragm was elevated, and the contents of the mediastinum were drawn to the right, as a result of the increased intrapleural negative pressure.

Two hours after the application of the oxygen the

patient appeared to be considerably relieved. About twenty-four hours later the temperature and pulse rate had dropped almost to normal, and the oxygen was removed. The following morning, March 16, the patient was again examined. The wall of the right side of thorax moved normally. The chest was resonant to

chyma of the lung after bronchial obstruction depends on the microbe infecting the obstructing mucus. A nonvirulent organism may induce mild pneumonia as a sequel of atelectasis, whereas a more virulent organism may cause a severe type of pneumonia, suppuration or gangrene.

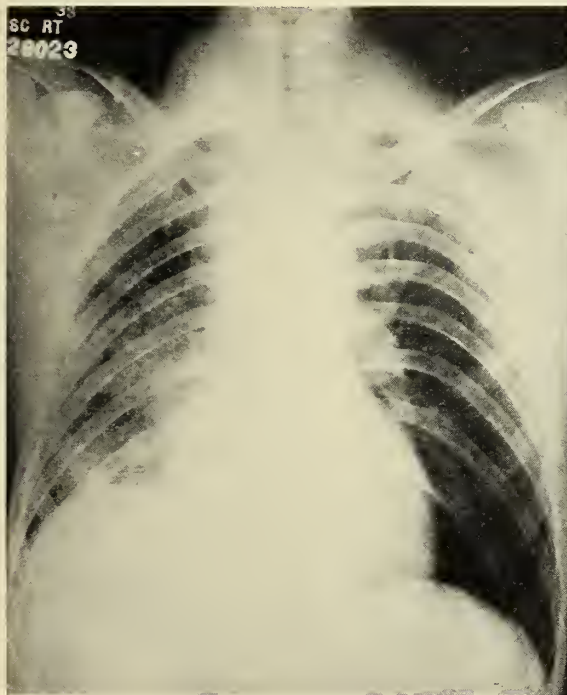


Fig. 3. March 17, 1933. Passive congestion.

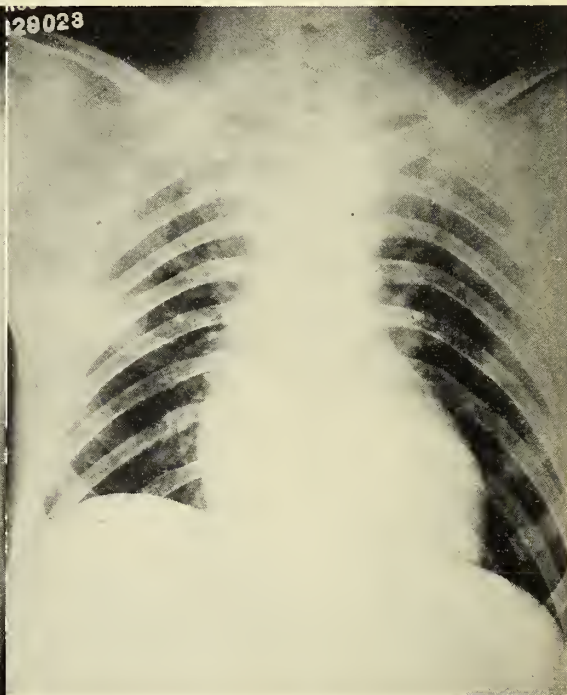


Fig. 4. March 21, 1933. Normal thorax.

percussion, and tactile and vocal fremitus were present. Breath sounds were heard on auscultation. A diagnosis of resolving atelectasis was made from a roentgenogram of the thorax (Fig. 2). March 17 the condition was practically the same as on the previous day, with the exception that moist râles were heard over the entire side, and on percussion an area of dullness was found posteriorly at the base on the right. A roentgenogram taken at this time (Fig. 3) resulted in a diagnosis of extensive bronchial pneumonia.

March 21, the seventh day after onset of symptoms in the thorax, the patient felt very well, and a roentgenogram (Fig. 4) showed the condition of the thorax to be normal.

COMMENT

It is apparently either very difficult or impossible in many instances to make a differential diagnosis of passive congestion and bronchopneumonia from the roentgenogram alone. Although this is the period in which bronchopneumonia may occur following massive collapse, the condition of the patient and the absence of elevated temperature and pulse indicated that if pneumonia were present, the causative organism was of low-grade virulence. In 1929 Coryllos produced experimental evidence to show that the fate of the paren-

chyma of the lung after bronchial obstruction depends on the microbe infecting the obstructing mucus. In the past, it has been more or less generally accepted that postoperative complications of the thorax have occurred with frequency as follows: (1) bronchial pneumonia, (2) infarcts of the lung, and (3) massive and lobar collapse. Massive collapse, although not as common as the first two conditions, probably occurs more frequently than is generally thought and cannot be said to be a rare condition.

In cases of postoperative complications of the thorax in which the condition lasts only a few days and the findings on auscultation are not serious, it is reasonable to suspect the presence of small areas of atelectasis rather than of bronchial pneumonia even though bronchial pneumonia may be diagnosed from the roentgenogram. In most such cases elevation of temperature and pulse rate is slight, and lasts for a day or two only. It is legitimate to speculate on the question of whether or not the most common postoperative complication of the thorax is primarily atelectasis. It would be difficult to answer this question, since small areas of atelectasis do not cause death. Also, no practical application can be made, unless in the future bronchial aspiration, carried out immediately following operation, causes marked diminution of complications of the thorax.

PRESIDENT'S LETTER

CANCER IN MINNESOTA

The report on cancer, as the result of the state-wide survey on cancer made by Dr. Frank Rector, one of the four field representatives of the American Society for the Control of Cancer, is a document of such vital interest to the medical profession of the state that we hope to place a copy in the hands of all our members.

A disease which has in thirty years mounted from sixth place as a cause of death to second place, certainly presents food for thought. Statistics show the average duration of symptoms to be two months before the cancer patient presents himself for examination, and after examination by the original physician consulted, a second period of seven months before adequate treatment is begun. This, coupled with the fact that the chance for a permanent cure decreases 16 per cent per month, is a terrible indictment of the medical profession today.

How many breasts would be watched for seven months if the entire profession of the state realized that each month's delay decreased the chances of recovery by 16 per cent? How many men in the state use Lugol's solution on the cervix as a differential diagnostic point between normal and pathologic tissue? How many early biopsies are done by competent pathologists on the patient living at a distance from a medical center? The lack of the ability to pay the fee is no valid argument when so many pathologists are willing to donate such services when the patient cannot pay the fee. How many men throughout the state realize that the destructive action of radium extends for a distance of 3 cm. only, hence the necessity, after the use of radium in cancer of the uterus, for deep x-ray therapy. Dr. Litzenberg makes the statement that treating cancer of the uterus by radium alone, without subsequent deep x-ray treatment, may be compared to the incomplete operative removal of a malignant tumor.

The missionary work of our state-wide committee on cancer, should start in the county societies. In conjunction with the university and the committee on hospitals and medical education, every county society in the state may have, for the asking, an annual cancer meeting which would be worth while. We hope, in addition, to have a cancer page in each issue of MINNESOTA MEDICINE, and that the committee on Public Health Education will do their part to make the public "cancer conscious" without producing "cancer phobia."

We hope to have the hospital records on cancer as recommended by the American College of Surgeons, adopted by all hospitals in the state. Radio talks on cancer will continue. Our secretary has 332 country newspapers which will accept news stories on cancer or any other medical subject. We expect to be able to announce that the university will offer at least two short cancer post-graduate courses in 1934. Cancer subjects, as well as a cancer exhibit, will be presented at the Duluth meeting. Dr. O'Brien has found students most receptive to discussions on cancer. Cancer is a live subject for addresses before parent-teachers' organizations.

Write to The American Society for the Control of Cancer, 1250 Sixth Ave., New York City, for lay literature on cancer for your waiting room tables.

The State Medical Association is helpless without general coöperation. Let's get going.



President,
Minnesota State Medical Association.

EDITORIAL

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HYPOTENSION

Hypotension is not as uncommon as one would be led to believe from the relatively few discussions that one reads in regard to this condition, although in various studies by Alvarez and by Barach, the incidence has been given as varying from 2.2 per cent to 5.5 per cent, with an average of about 3.5 per cent.

In earlier investigations confusion arose as to what systolic pressure should be considered to be the upper limit for patients with hypotension, because of variations arising from the use of auscultation and palpation as methods of determination. The auscultatory method is now used en-

tirely, and 105 to 110 millimeters of mercury or less, systolic, is considered to be a hypotensive level for adults.

Members of the medical profession are familiar with the secondary hypotension commonly observed in convalescence from acute illness, especially from diseases of the upper part of the respiratory tract, and in Addison's disease, myxedema, some forms of anemia, tuberculosis, Froehlich's syndrome, mitral valvular heart disease, shock, and conditions in which the myocardium is failing, but concerning essential hypotension they usually are at a loss for an explanation.

Several important questions frequently arise in the mind of the physician who is caring for patients with essential hypotension. What is the cause and background of this condition? Is the endurance of these patients normal or reduced? Are they able to resist infections and disease? Is their expectancy of life comparable with that of patients whose blood pressure is normal? Do they have an equal chance in the event of surgical operation, and as a corollary to this last, should only operations of necessity be performed, or may those of election also be included?

In 1922 this subject was given a stimulus by Roberts, who analyzed 444 cases of hypotension in regard to classification, sex, age, associated diseases and laboratory studies. Friedlander expressed the belief that the hypotension may result from the poisonous effect on the capillaries of histamine and other vaso-dilating substances that constantly are being produced in the body. Barach's hypothesis is that respiratory deficit and decreased oxidation result from a poor respiratory apparatus and that the combined effect is hypotension. Fossier has presented a theory based on the mechanical effects of the asthenic habitus of the persons in this group. Meakins has emphasized the occurrence of hypotension in the presence of jaundice. The presence of hypoglycemia with hypotension was first observed and is now being studied by Barach. Mortensen attempted to correlate the hypoglycemia found in cases of hypoglycemia with a sympathetic fatigue and resulting hyposuprarenalemia as a cause of the easy physical fatigue that these patients exhibit. Kisch presented an extensive review of the literature in 1930.

In a recent study of 250 patients with essential hypotension, in which the blood pressure was 100 mm. of mercury or less, the group mortality following major surgical procedures was

only 1.6 per cent, which is less than that for an unselected group undergoing similar operations. It was noteworthy that those who died following operation were all elderly. This study would indicate that patients with hypotension can undergo operations of election as well as those of necessity, and that the resistance of patients in this group is high.

The expectancy of life in this group has been stated by Fischer to be better than average, for he found that the expected mortality was only 35 per cent of that found in the standard American tables of mortality.

Thus, some of the queries regarding this problem have been answered, but the question of etiology is none too clearly explained and remains a challenge to future investigation.

J. STUART MCQUISTON, M.D.

CWS PROJECTS FOR NURSES IN MINNESOTA

The very urgent need for increased employment has been met to a large extent by the CWS. The speed with which the Minnesota administrators of the CWS put into employment the state's quota of some 85,000 unemployed persons has been an amazing achievement.

Of the large number of men and women given work, approximately 200 have been nurses. No accurate summary of the type of work being done by these nurses is at present available. The bulk of them come under the adequate supervision of established institutions such as Ancker Hospital in Saint Paul, the General Hospital in Minneapolis, etc.

Considerable numbers are doing bedside nursing under physicians' supervision throughout the state. Others are doing school nursing or some type of Public Health nursing. A real effort is being made to take up such slack as may have been left here and there under the stress of the emergency orders for speed in giving out jobs.

A special project under the state Civil Works Service administration has been assigned the State Health Department at the request of Mr. Harry Hopkins, Federal Relief Administrator. Last fall the Children's Bureau suggested the need for a survey of the health and nutritional needs of children in families on relief. The special project will facilitate this survey. It proposes that a nationwide study be made. To Minnesota are allotted forty Public Health nurses with three supervisors. These are to be under the immediate direction of Miss Olivia Peterson, Superintendent of Public Health Nursing for the state in the Division of Child Hygiene of the State Department of Health.

A program under which these nurses may operate has been drawn up, the supervisors have been engaged and about half of the forty nurses

have been engaged to date. These nurses must be adequately trained in Public Health nursing, and at this time such nurses are at a premium.

Events progress so rapidly in this project that a final statement cannot be made at this time. Every effort is being made to make the work of these Public Health nurses fit into the Federal program of relief work for doctors, as well as to adapt it to the individual needs of each county and to harmonize it with existing facilities and institutions.

CWA MEDICAL AND HOSPITAL CARE

Since November 16 last the Civil Works Administration has furnished some four and a half million men and women with jobs. Work has been found for this large army in many cases by resorting to the pick and shovel and instituting numerous types of surveys. This vast number of individuals, equivalent to our enlistment in the World War—the 85,000 in Minnesota equivalent to an army division—has been taken into the employ of the Federal Government and they are entitled to free hospital and medical care. The program is admittedly a temporary expedient, funds being available for its continuance to the middle of February with the likelihood that Congress will make further appropriations of a temporary nature. Wages paid are not the minimum necessary to keep the wolf from the door, but in some instances are higher than can be paid by industry.

The group has doubtless, temporarily at least, been relieved of the need of accepting medical charity. According to the United States Employees' Corporation Act of 1916, medical and hospital care shall be provided for government employees suffering from accident or illness in line of duty by Federal physicians and hospitals. For other accidents and illnesses the employee must provide for himself.

Through the combined efforts of representatives of the American Catholic and Protestant Hospital Associations and the A. M. A. in conference last month with the U. S. Federal Employees' Corporation Commission and the members of the Civil Works Administration, an agreement has been reached whereby CWA employees in need of medical and hospital care may be sent to private hospitals by their private physicians, the government to pay the hospital bill and the physician's fee with certain stipulations. The schedule of hospital charges has already been agreed upon, the \$3.50 a day allowance to cover certain routine nursing and laboratory service, and a materially reduced scale of charges for additional laboratory service has been agreed upon. It is specified that the agreement will not be continued beyond the period of emergency and is not a commitment on the part of the hospitals as to

the adequacy of the hospital service charges. Physicians' fees according to instructions sent out by the U. S. Employees' Compensation Commission to State Civil Works Administrators are not to exceed those charged by physicians to patients in the same income class as the injured person. To date the matter of the physician's fee has not been definitely settled in this state but indications are that the physician who desires to participate will be required to make a reduction in his usual minimal fee schedule. The physicians in each county will have to arrange details as to local available hospitals and physicians with the county CWA representative.

The indications are that the various Veterans Hospitals are not in a position from location or capacity to care for this additional load. Municipal hospitals are at present overcrowded. The utilization of private hospitals and private physicians is the logical solution of this temporary problem although it cannot be too strongly emphasized that the procedure is an emergency measure, from the standpoint of the medical profession as well as the hospitals, in order to furnish adequate medical care for this group of additional government employees.

WHAT THE CWA AND THE FEMR MEAN TO THE PHYSICIAN

RECENT INTERPRETATIONS AND DECISIONS

By E. A. MEYERDING, M.D.

Washington has held that employes of the CWA (Civil Works Administration) and the CWS (Civil Work Service which is organized for the purpose of making studies and surveys of various kinds in contradistinction to the CWA construction projects) are federal employes and, therefore, necessarily come under laws governing all federal employes. Authorities in charge of these employes must comply with the laws. No changes can be made to apply to these emergency employes except by act of Congress.

To members of the medical profession who find the operation of these laws in employment under CWA unsatisfactory, it should be pointed out that the laws have been on the statute books for a long time. They have come to the attention of many individuals for the first time, now, because current emergencies have brought them to the fore. It is obviously impossible to change the laws at short notice in order to make their operation in this instance more palatable to individual groups.

PROFESSION MUST COÖPERATE

The only course open to the medical profession in the handling of injuries of employes of the CWA and the CWS is to coöperate fully and intelligently with the federal authorities in charge and with the United States Employees Compensation.

The American Medical Association is in active contact with officials in charge and is taking every precaution to see that arrangements are made on the basis of an emergency which will terminate within a period of a few months. They have approved the plans of the Administration as the following quotation from a letter to state secretaries, dated January 8, 1934, from William C. Woodward, director of the Bureau of Legal Medicine and Legislation of the A. M. A. shows.

"The principles to be followed by the United States Employees Commission and the Federal Civil Works Administration in the

hospitalization of Civil Works Administration Employees have been agreed on. They have received the approval of representatives of the American Hospital Association, the Catholic Hospital Association and the Protestant Hospital Association and are to be recommended to the members of those organizations for acceptance. . . .

"The United States Employees Compensation Commission holds that the law requires that patients entitled to hospitalization or medical service at government expense be referred to non-federal hospitals and to private physicians only when United States hospitals and medical officers are not available."

BULLETIN TO LOCAL ADMINISTRATORS

Recognizing the fact that Federal facilities are not available or adequate in most communities where CWA employes are at work, the United States Employees Commission, in a bulletin to local administrators dated January 8, has enunciated a policy of utilizing civilian physicians and hospitals. Copies of this bulletin have been sent by the Minnesota State Medical Association office to county officers, council members, committee chairmen and delegates of the state association.

In this bulletin, local administrators of CWA work in each county are instructed to take up the matter of treatment of injured employes with their local county medical societies. A schedule is to be arranged between them whereby all reputable licensed physicians in the county who are accessible and who desire to handle such work on the fee basis stipulated by the commission, shall have a fair chance to treat these injured employes.

Mr. A. B. Hemp, Minnesota State injury officer for the CWA, made the following statement about the management of the work under his jurisdiction at the State Office, January 17:

"The Commission and the CWA Administration wish to work in complete understanding and harmony with the medical profession. They wish to give all reputable physicians who desire it a chance to do the work in their own communities and they feel that the best way to accomplish that end is to allow local administrators to deal directly with physicians in their districts."

Obviously, it is to the interest of physician's in every community to meet with their local administrators and make arrangements jointly with him and with their fellow practitioners, taking into account local problems, peculiarities and distances.

Following a policy clearly defined by Harry L. Hopkins, director of the Civil Works Administration, no special government physicians are to be designated in rural districts as the following paragraph from a letter from the chief assistant claim examiner in Washington to a local CWA administrator in Minnesota dated January 13, will show.

"You are advised that is not a designated physician of this commission (the United States Employees Commission). It is suggested that you use your local doctors in rotation as recommended by the County Medical Society. However, it will not be necessary that you confine your selection to physicians who hold membership in the county medical society. Any reputable physician may be used for treating injured employes of the Civil Works Administration."

FOR LARGE CITIES

The policy outlined above has been altered somewhat in the large cities according to Mr. Hemp, and at date of going to press (January 17). Dispensaries with physicians in the employ of the CWA have been set up at convenient places for handling so-called First-Aid cases in the cities. Where injuries require treatment that cannot be given at the dispensaries, the men will be sent to specialists and hospitals as arranged between the local administrator and the County Medical Society involved.

The Civil Works Administration and Commission as now organized are undoubtedly disposed to deal fairly and sympathetically with the medical profession.

It rests with the profession, itself, to coöperate fully with the administration. The alternative, in spite of the

above outlined policies, will undoubtedly be the designation of government physicians to do all of the work.

NEW COUNTIES ON FEDERAL EMERGENCY RELIEF

Sixteen counties have been added to the list of Minnesota counties organized for relief, since publication of the list in the January issue of MINNESOTA MEDICINE.

They are Clay, Douglas, rural Hennepin, Lincoln, Lyon, Morrison, Polk, Red Lake, Redwood, Renville, Stevens, Swift, Todd, Wadena, Wilkin and Yellow Medicine.

Physicians in these additional counties are now eligible to receive fees from federal relief funds for care of their relief patients. The same procedure as outlined in the January issue, is necessary; the physician who desires to do such work must send his name to the local relief worker in charge of relief work in his own county.

It is the impression of officials of the State Board of Control in charge of the FEMR, that the plan is working smoothly in the majority of rural counties in the state.

Payment to Ramsey county physicians desiring to care for relief patients under the agreement reached by the Ramsey County Medical Society and the Board of Public Welfare have not been made to date.

The Ramsey County Board of Welfare is taking the matter under advisement as this issue goes to press, waiting until funds are available to allocate to this purpose, according to G. A. Lundquist, executive secretary.

Medical men who are interested in obtaining employment of any kind under the CWA should consult the local CWA Administrator. No money can be paid to any employes whose applications are not on file in proper form with the administrator.

OBITUARY

Dr. Benjamin F. Simon

1870-1933

Dr. Benjamin F. Simon, Saint Paul health officer for over fifteen years, died suddenly on December 15, 1933, at the age of sixty-three.

Dr. Simon was born in Le Sueur County June 13, 1870, the son of a clergyman. After attending Hamline University and taking three years of medical training at the University of Minnesota he completed his medical course at Rush Medical College in 1900.

After practicing medicine in Saint Paul for nearly twenty years, Dr. Simon was appointed health officer in Saint Paul on June 13, 1918, just preceding the influenza epidemic. The control of the smallpox epidemic by thorough vaccination in 1924 was much to his credit. During his fifteen years of administration more than 65,000 diphtheria immunizations were accomplished in the school children of the city.

Dr. Simon was a member of the Ramsey County Medical Society and the State and American Medical Associations. In October he went to Washington to receive the thirty-third degree in Masonry. He was past potentate of Osman Temple of the Shrine.

Dr. Simon is survived by his widow, a son Grant, daughter Dorothy, two brothers, Dr. E. J. Simon and Almon R. Simon of Saint Paul, and four sisters, all of whom are teachers in the Saint Paul public schools.

OF GENERAL INTEREST

At the annual dinner meeting of the Minnesota Academy of Medicine, Dr. Archa Wilcox was elected president for the year 1934 and Dr. A. R. Hall was elected vice president. Dr. R. T. LaVake was reelected secretary.

The Minneapolis Surgical Society will hold its twelfth Annual Anniversary Foundation Dinner on Thursday, February 1, 1934, at the Minneapolis Club in Minneapolis. The guest speaker will be Dr. Lester R. Dragstedt, professor of surgery at the University of Chicago, and his subject will be "The Etiology of Gastric Ulcer." The Minneapolis Surgical Society which was founded in 1922 and which has a limited membership of fifty is celebrating its twelfth anniversary with a completed membership list.

Dr. Charles N. Spratt was invited to demonstrate motion pictures of his cataract and glaucoma operations at a meeting on January 22 before the California Study Club at Los Angeles. Dr. Elschig, of Prague, was the guest speaker at the same meeting. Dr. Spratt also showed his motion pictures at Aberdeen, S. D., on January 9, and at the Des Moines Academy of Ophthalmology on January 15. He was also on the program at meetings of Ophthalmological Societies at Long Beach and San Diego.

Dr. E. Starr Judd, Professor of Surgery in the Mayo Foundation, has endowed an Annual Lectureship in Surgery at the University of Minnesota.

The first Judd Lecture will be given by Dr. Dean Lewis, President of the American Medical Association and Professor of Surgery at the Johns Hopkins Medical School, on Tuesday, February 13, in the Anatomy Amphitheater at the University of Minnesota at 8:15 P. M. The subject of his lecture will be "The Hypophysis, the Master Gland: the Histology, the Physiology, and the Clinical Syndromes Associated with Its Lesions." Dr. Judd is a graduate of the Medical School of the University of Minnesota of 1902.

A Committee to Study Medical Care in Isolated Communities has been appointed by F. J. Savage, president of the Minnesota State Medical Association. This committee will make a careful study of the situation in remote communities at some distance from a physician where medical care is said to be insufficient.

Membership includes Dr. Savage as chairman, I. M. Hayes, Minneapolis, and W. L. Burnap, Fergus Falls, council members, and A. T. Agnew, International Falls; H. E. Binet, Grand Rapids; C. B. Lenont, Virginia; R. L. Burns, Two Harbors; C. A. Scherer, Duluth; J. L. Delmore, Roseau; G. I. Badeaux, Brainerd; O. F. Mellby, Thief River Falls; H. A. Burns, Ah-Gwah-Ching, and Einar Johnston, Bemidji.

MARTIN GUSTAV AND CAROLINE RUNICE HANSON FUND

On March 13, 1933, Dr. Adolph M. Hanson, of Fari-bault, Minn., executed a legal assignment to the Smithsonian Institution of all royalties accruing to him under a patent on his discovery, the isolation of the parathyroid hormone (extract of parathyroid gland and process of preparing same). In making this offer, Dr. Hanson, a lieutenant colonel in the Medical Reserve

Corps, United States Army, stated that he wished the gift to appear as a memorial to his father, Martin Gustav Hanson, and his mother, Caroline Runice Hanson, and that he wished the income to be applied "to some scientific purpose, preferably in chemistry or medicine." He added, "I hope that my example may serve as an inspiration for others in the future and add to the interest in our National Institution."

The Institution accepted the gift, and already considerable sums have been received from royalties. These will be applied to the scientific work of the Institution, giving preference whenever practicable to researches in chemistry or medicine, in accordance with the wishes of the donor.

Dr. Lester R. Dragstedt, Professor of Surgery at the University of Chicago, will give the oration on Surgery at the next annual anniversary meeting of the Minneapolis Surgical Society to be held at the Minneapolis Club, February 1, 1934.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

NORTH DAKOTA QUACK WARNED TO REFRAIN FROM PRACTICING

J. Theodore Weber, about twenty-six years of age, who lives at 206 4th St. S., Wahpeton, North Dakota, has been warned by Mr. Brist on behalf of the Minnesota State Board of Medical Examiners to refrain from practicing in the State of Minnesota without a license. For sometime Weber, who claims to be a magnetic healer, has been coming to Fergus Falls, Pelican Rapids and Rothsay, Minnesota, remaining about a week on each trip. When interviewed at Wahpeton, North Dakota, Weber admitted that he had no license; that he was a former student at the Palmer School of Chiropractic at Davenport, Iowa, and was seeking to practice in order that he could get enough money to complete his so-called education. Weber was told that if he returned to the State of Minnesota a warrant would be issued for his arrest. This is pursuant to arrangement made with Mr. Townley, County Attorney of Ottertail County.

Weber stated to Mr. Brist that he would not return to the State of Minnesota. If this man attempts to practice healing in any form in the State of Minnesota in the future, the Minnesota State Board of Medical Examiners asks that it be immediately notified at 524 Lowry Medical Arts Bldg., St. Paul, Minnesota.

HOUSTON COUNTY WOMAN CONVICTED OF MANSLAUGHTER

State of Minnesota *vs.* Mae Jackson Mitchell. After a trial lasting five days, Mae Jackson Mitchell, sixty-three years of age, of Hokah, Minnesota, was convicted by a jury of the crime of manslaughter in the first degree. Judge Vernon Gates of Rochester, Minnesota, who presided at the trial, sentenced the defendant to an indeterminate term in the Women's Reformatory at Shakopee, Minnesota. The sentence is for five to twenty years as provided for by law.

The defendant was arrested on August 25, 1933, on a complaint signed by the father of a twenty-two year old Winona County girl whose death occurred at La Crosse, Wisconsin, on August 23, 1933, from peritonitis and general septicemia following the performance of a criminal abortion. Mrs. Mitchell testified that she did not perform the abortion, but admitted that the girl was there at her place for that purpose. The defendant also testified that for thirty or forty years she had done practical nursing and midwifery in Houston County, but was neither a registered nurse nor a licensed midwife.

During the trial, and before sentence, Mr. L. L. Dux-

bury, representing the defendant, attempted to show that the prosecution was influenced by the Minnesota State Medical Association. This was denied by Mr. Brist who stated to the Court that he appeared at the request of the County Attorney, Mr. William E. Flynn, and on behalf of the Minnesota State Board of Medical Examiners.

MINNEAPOLIS MEDICAL CORPORATION PREVENTED FROM PRACTICING MEDICINE

State of Minnesota *ex rel.* Harry H. Peterson, Attorney General, *vs.* The Medical Service Company, a corporation.

Following an investigation made by the Minnesota State Board of Medical Examiners, Quo Warranto proceedings were instituted on December 2, 1933, by the Honorable Harry H. Peterson, Attorney General of the State of Minnesota, to have forfeited to the State of Minnesota the charter of The Medical Service Company, a Minnesota corporation.

The Medical Service Company, 404 Donaldson Bldg., Minneapolis, Minnesota, was organized August 1, 1933, by Dr. Edwin C. Muir, a licensed physician, Mr. H. W. Strong and M. R. Muir. This corporation ostensibly was organized for the following purposes:

"The purposes of this corporation are to own and operate a clinic or hospital where patients may receive medical or surgical treatment and to enter into contracts with individuals or co-partnerships to furnish them or any of them medical care or treatment; and to enter into contracts with other corporations for furnishing and providing medical or surgical care and treatment to their employees."

Following the organization of this corporation medical business was solicited by lay representatives of the corporation in the City of Minneapolis, and particularly among the school teachers, where complete medical services were offered for the sum of \$1.50 per month. This service included examination, medical treatment, prescribed medicines and surgery.

A stipulation has been entered into by the Attorney General and The Medical Service Company, whereby the corporation is to be completely dissolved according to law on or before February 20, 1934. There is to be no further solicitation of business of any kind whatsoever. Unless the corporation is dissolved on or before February 20, 1934, judgment will be entered annulling the franchise of the corporation and forfeiting its charter to the State of Minnesota.

The Supreme Court of Minnesota, and the Supreme Courts of other states have repeatedly held that the practice of medicine can be engaged in only by a licensed individual; that the practice of medicine is not a proper field for corporate activities. The Minnesota State Board of Medical Examiners intends to enforce this provision of law and to have legal proceedings instituted to stop such unlawful practice of medicine.

LASH-LURE

There have been sixteen cases of severe untoward effects reported following the use of a single product called "Lash-Lure." This preparation is an aniline dye having for its base probably either paraphenylenediamine or paratolylenediamine or some closely related substance. Every physician, and practically every responsible beauty parlor, knows the risk that is run in the application of dyes of the aniline type to the hair of the scalp. It has long been good beauty parlor practice to insist that persons who are to be subjected to an aniline hair dye should be tested for sensitivity to that product. Because of the irritating effects of such dyes, there is no justification for the use of so dangerous a substance around the delicate tissues of the eye. Cosmetics are under no national control. The Lash-Lure tragedies emphasize the need of some sort of national control over the sale of cosmetics. (JOUR A. M. A., November 11, 1933, p. 1566.)

A FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

Outline of Plans for 1934

The year 1934 finds the medical profession confronted with problems of considerable complexity and importance. Of necessity, during the past few years we have been compelled to take a more complete inventory of the equipment, both economic and scientific, with which we carry on our professional activities.

The public have shown an increasing interest in Public Health matters. Numerous organizations are active in promoting health propaganda and activities. Many of these organizations are controlled and motivated by law groups. The Minnesota State Medical Association has set a high standard of efficiency in cooperating and guiding these various activities. The personnel of the Public Health Education Committee of the State Medical Association feel that we have a definite responsibility in the work of this committee.

Our by-laws state the purpose of this committee to be as follows:

1. To strive to develop an intelligent public viewpoint toward the medical profession.
2. To cooperate with the various agencies throughout the state whose function is the promotion of public health, and whose governing bodies are composed in whole or in part of laymen, so that from a medical standpoint these agencies shall be intelligently administered.
3. To use such measures throughout the state as may be necessary to eliminate fraudulent medical advertisements from the public press.
4. To aid and encourage each component society to conduct at least one annual public health meeting.
5. To encourage public health educational matters through the channels of the public press, radio, movies and lecture platform.

The committee hope to stress particularly during 1934

1. Preventive Medicine.

A. Immunization

1. Smallpox— we grow careless regarding vaccinations.
2. Diphtheria—many cities have practically eliminated diphtheria as a cause of death. Board of Health Statistics show twenty-six deaths from diphtheria in this state during 1933.
3. Scarlet fever—vaccination has been shown to be effective in a definite percentage of children.
4. Typhoid fever.

B. Malnutrition—The Child Health Recovery program of the U. S. Department of Labor recognizes the importance of undernutrition particularly at this time.

C. Mental Hygiene—A field of medicine that is being ignored by too many of us.

2. Tuberculosis Check-up. The public are becoming educated to the value of this measure. We must not lag behind as a group.
3. Cancer. The President's February letter brings forth startling facts concerning delay in advising treatment by the physician.
4. Heart Disease. The greatest cause of death in Minnesota and should receive consideration in all county society programs.
5. Conservation of Hearing and Vision.
6. Birth Control and Sterilization of the Unfit. The medical profession would do well to have a thorough understanding of the various medical aspects of these problems, and also the legal questions involved.

The resources of this committee are at the disposal of every member of the Association. These resources include a speaker's bureau and a reference library.

That we may be of the greatest service to the profession throughout the state we welcome suggestions pertaining to this work, from any member.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MEDICAL BROADCAST FOR THE MONTH

The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 10:15 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of February will be as follows:

February 7—Heart Fear.

February 14—Measles.

February 21—The Common Cold.

February 28—Tumors of the Skin.

MAYO FOUNDATION LECTURES

A special program of lectures and demonstrations in medicine will be held under the direction of the Mayo Foundation from March 5 to 9, inclusive. Mornings will be devoted to surgery, demonstrations of oxygen therapy and of intravenous therapy, and consideration of postoperative complications. In the afternoons medical subjects, including gastro-enterology, dermatology and syphilis, will be discussed, and a symposium on dyspnea will be held. In the evenings clinico-pathologic conferences will be conducted.

While this program is arranged primarily for the Fellows of the Foundation, visiting physicians are invited to attend.

SOUTHEASTERN SURGICAL CONGRESS

The Southeastern Surgical Congress will hold its fifth annual assembly in Nashville, Tennessee, March 5, 6 and 7, 1934. The Andrew Jackson Hotel will be hotel headquarters and the lectures and exhibits will be in the War Memorial Building.

The following doctors will occupy places on the program: Fred H. Albee, New York; W. Wayne Babcock, Philadelphia; S. O. Black, Spartanburg; Vilrav P. Blair, St. Louis; Frank K. Boland, Atlanta; J. B. Brown, St. Louis; D. B. Cobb, Goldsboro, N. C.; George W. Crile, Cleveland; T. C. Davison, Atlanta; John F. Erdmann, New York; P. G. Flothow, Seattle; Seale Harris, Birmingham; M. S. Henderson, Rochester, Minn.; Arthur E. Hertzler, Halstead, Kansas; Chevalier Jackson, Philadelphia; Walter C. Jones, Miami; Dean Lewis, Baltimore; Joseph F. McCarthy, New York; C. Jeff Miller, New Orleans; A. J. Moonney, Statesboro, Ga.; John J. Moorhead, New York; Edward T. Newell, Chattanooga; Fred Rankin, Lexington, Ky.; Paul R. Ringer, Asheville; Stewart Roberts, Atlanta; George H. Semken, New York; Phil C. Schreier, Memphis; Arthur M. Shipley, Baltimore; H. E. Simon, Birmingham; A. O. Singleton, Galveston; J. R. Young, Anderson, S. C.; Waitman F. Zinn, Baltimore.

For information, write Dr. B. T. Beasley, 1019 Doctors Building, Atlanta, Georgia.

ANNUAL MEETING OF COUNTY OFFICERS AND NORTHWEST MEDICAL CONFERENCE

The Annual County Officers Meeting of the Minnesota State Medical Association will be held Saturday, February 24, at the Lowry Hotel in Saint Paul. The meeting will begin at 9 A. M. and will include a noon luncheon and an afternoon program.

The Northwest Medical Conference, attended by officers of state medical societies from all of the Northern and Northwestern states, meets annually in Saint Paul as a central point. It will hold its 1934 session Sunday, February 25, at the Lowry Hotel. Several guests to the Sunday conference are expected to be present and speak at the county officers' meeting Saturday.

Important recent development in the government's Civil Work program and in the operation of Federal Emergency Medical Relief will occupy a large share of program time. Complete information on the present status of the program will be available and an extensive discussion of its relation to physicians, nurses and dentists and to medical practice in general is scheduled.

Among other subjects to be discussed are administrative matters involving county and district medical societies and including the building of scientific programs, a model constitution and by-laws, office and record keeping equipment; an outline of the service to county and district societies of the Public Health Education Committee; a discussion of preventive medicine and immunization as part of medical practice; a review of legislation in the special session and discussion of the legislative program for 1935.

All members are invited and are welcome to attend this meeting. Expenses of secretaries are paid.

WASHINGTON COUNTY SOCIETY

The Washington County Medical Society held its regular monthly meeting January 9 at Stillwater.

D. Greth Gardiner, St. Paul, gave an illustrated lecture on "Bronchoscopy and Thoracoplasty." F. F. Callahan, Pokegama, discussed the paper.

THE HOSPITAL FORMULARY

The Council on Pharmacy and Chemistry reports that recently a committee issued a Formulary for the New York Hospital, and that an article by Robert A. Hatcher and Wendell J. Stainsby, which discusses some of the major problems of the Hospital Formulary, is in harmony with the ideals of the Council. According to the article of Hatcher and Stainsby, large hospitals find it necessary to limit the prescriptions of the staff mainly to selected formulas, and this system has tended to promote the use of proprietary formulas, which usually cost much more than their official equivalents without corresponding advantage. The formulary of the New York Hospital was prepared by a committee, which invited representatives of every department to present formulas desired for their departments. In every case where a complex formula or a proprietary preparation was desired the advocate of it was requested to present evidence of its superiority over the equivalent official preparation, and unless such evidence was submitted the committee declined to admit the article, or, in a few cases, admitted it with the proviso that it would be deleted unless evidence was presented that would justify its retention in a subsequent edition of the formulary. As indicated in the rules, this does not interfere with the therapeutic study of any proprietary preparation, nor does it prevent the use by any department in the hospital of any substance concerning the superiority of which the staff is so firmly convinced that it is willing to conduct a scientific study of its uses, or to provide it at departmental expense. This plan requires for its fullest success a highly skilled pharmaceutical staff capable of cooperating with the medical staff. The training of men to fill the pharmaceutical positions in such progressive hospitals constitutes at once an opportunity, and a challenge to the schools of pharmacy, for there are few such pharmacists now available. (*Four. A. M. A.*, December 2, 1933, p. 1802.)

TRANSACTIONS OF THE MINNEAPOLIS SURGICAL SOCIETY

STATED MEETING HELD NOVEMBER 2, 1933

Vice-President, DR. MARTIN NORDLAND, in the Chair

PRESENTATION OF CERTIFICATE OF MEMBERSHIP TO LAWRENCE M. LARSON, M.D.

By MARTIN NORDLAND, M.D., *Vice President*

The Minneapolis Surgical Society was organized in 1922 by a group of young surgeons who saw the need and benefit of such an organization. There were twenty-nine charter members. The foresight and ability of these men account for the splendid organization we now have. Since then, the membership has been gradually increased, care being exercised to select men of a high type as well as those who would be interested in building up the society.

Some time ago it was voted that the membership should be limited to fifty active members and in May, 1933, this total was reached.

About a year ago it was voted by the Council to present each member with a certificate of membership. The certificates for the Charter members were to bear this special designation, and these credentials were to be signed by the original officers of the Society. All of the older members have now received their certificates. It was thought appropriate to present each newly elected member with his certificate after the reading of his thesis.

Dr. Lawrence Larson, who was elected to the Minneapolis Surgical Society last May, is the first member to receive his certificate formally, having read his thesis at the September meeting.

The Society is honored to have men of Dr. Larson's capabilities and qualifications become active members and I hope that he will find opportunity to give to the association and he in turn will be benefited by his affiliation with our group. I find it a pleasure to present him with his affidavit of membership.

Case Reports

THYROGLOSSAL DUCT CYSTS WITH PRESENTATION OF THE PATIENTS AND SLIDES

J. M. HAYES, M.D.

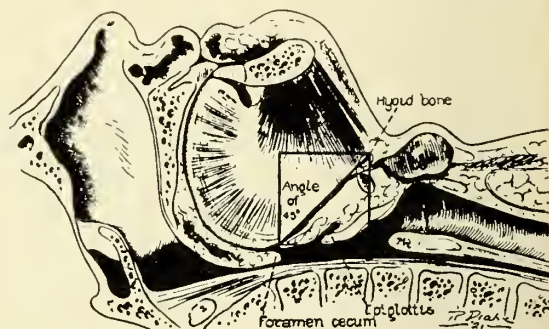
At the time I was called upon to take part in this program I had a child about three and one-half years old in my office presenting one of the best text-book pictures of a thyroglossal duct cyst I have seen for a long time. This cyst, about 2 cm. in diameter, was located in the mid-anterior portion of the neck at the level of the hyoid bone. The mass could be moved about freely and the tract, as far back as the hyoid bone, could be palpated. As you know, not many of these cases carry as striking a picture of the typical condition.

The two patients I have to present this evening are boys, six and ten years of age, the one operated in 1928 and the other in 1930. Both had been previously operated upon because of an acute infection in the cysts. At the first operation the cyst was merely opened and drained. In one of these patients the scar is much more marked on account of a previous severe infection. The abscess had dissected its way down toward the clavicle and the diagnosis was not so simple as in the other case.

In both of these cases the Sistrunk type of removal was done. The cyst and tract up to the hyoid bone were dissected out, then a section about 1.5 cm. long was taken from the hyoid bone. From this point upward and backward at an angle of 45 degrees to the hyoid bone, a block of tissue about 0.5 cm. in diameter was dissected out as far as the foramen cecum. The muscles and segments of the hyoid bone were

then sutured in the midline, the wound closed and a small penrose drain inserted.

It was my good fortune to have been working with Sistrunk about the time he determined to do this type of operation. The fact that there were so many cases of recurrence following previous operations, lead him to adopt this technic. In some of those with recurrence the cyst had merely been drained several times; in some the tract had been removed as far back as the hyoid bone; in some an attempt only had been made to remove the tract as far back as the foramen cecum.



The accompanying illustration is a drawing showing the relation of the cyst to other structures and the course of the thyroglossal tract to the hyoid and tongue (Sistrunk). Symptoms in many cases will recur if the tract posterior and superior to the hyoid bone is not removed.

DISCUSSION

DR. MARTIN NORDLAND: I operated upon a man within the last two years who had a thyroglossal duct cyst of rather large proportions. It was typically situated in the middle of the neck and was large enough to descend to a position between the two lateral lobes of the thyroid. The interesting part of the situation was that he also had a toxic exophthalmic goiter. The cyst was tense, about the size of a hen's egg and was thought to be an unusually enlarged median lobe of a diffusely enlarged thyroid gland.

At operation, when the cyst was recognized, the problem that presented itself was what to do with it. There was the danger of rupturing the cyst and infecting the field. To avoid this I first did a thyroidec-tomy in the usual manner and then dissected out the cyst according to the method of Sistrunk.

The patient made an uneventful recovery.

FIBROID TUMOR OF UTERUS

PRESENTATION OF A FRESH SPECIMEN

WILLARD C. PETERSON, M.D.

This tumor is presented because of its size. It is a large multiple fibroid weighing twenty-eight and one-half pounds.

The patient, a woman fifty-two years of age, came to my office two days ago with the main complaint of ability to eat only small amounts of food. On questioning her, she gave the following history:

She had always been well and strong but during the last four or five years she became more readily tired. Although her weight remained about the same, the patient's arms and legs became noticeably thinner and her abdomen increased in size. Her digestive disturbance consisted of a feeling of fullness and belching of gas after eating. Her bowels were normal. Menstruation had been regular but had become less in amount. She has one daughter, fourteen years of age.

Physical examination revealed a woman about five feet, eleven inches tall, weighing two hundred and thirty-four pounds. Examination was essentially negative with the exception of the abdomen which, on palpation, revealed a hard nodular mass extending from the symphysis to the xiphoid, and which gave the appearance of a greatly distended abdomen. Vaginal examination revealed the cervix somewhat softened and in the mid-line. X-ray examination was negative.

The patient was operated at Northwestern Hospital on November 1, 1933. A midline incision was made, extending from the symphysis nearly to the xiphoid. The tumor mass had crowded the intestines into the upper abdomen. It was adherent at several areas posteriorly, necessitating its removal extra-peritoneally. Post-operative convalescence was uneventful.



The accompanying photograph will give some idea of the size of the tumor and its appearance.

DISCUSSION

DR. MARTIN NORDLAND: How long has the patient been complaining of her abdomen?

DR. WILLARD C. PETERSON: She states that it has been distressing her for about a year and a half.

FUTURE SURGICAL STATUS OF COLLAPSE THERAPY PATIENTS

T. J. KINSELLA, M.D.

Experience at Glen Lake with both major and minor surgery and pregnancy in a group of patients with pulmonary tuberculosis who were being treated by the

various types of collapse therapy is summarized in the table below.

From this study, it is quite evident that necessary operative procedures may be undertaken in this group of patients without undue risk if due respect is paid to the tuberculous process and to the reduced respiratory reserve. Emergency surgical procedures may be undertaken here as in other tuberculous individuals without delay. Operations of election, however, should be postponed until the patient is well accommodated to the collapse and until the tuberculosis is quiescent, if the operative risk is to be held to a minimum. Local or spinal anesthesia is to be preferred to general anesthesia, particularly in the presence of active pulmonary tuberculosis. Spinal anesthesia to the 5th or 6th dorsal level has been well tolerated by all the individuals in this group. General anesthesia, particularly with nitrous oxide, is quite likely to be attended by cyanosis and imperfect relaxation because of diminished vital capacity. But one pulmonary complication, aside from tuberculosis, was encountered in the series in spite of the markedly diminished respiratory reserve.

These patients, the same as other individuals with active tuberculosis, demand a considerably longer convalescent period than nontuberculous individuals with the same lesion, if reactivation of the tuberculosis is to be avoided. The mortality encountered in this series is more closely related to the original pathology and the tuberculosis than to the diminished vital capacity and in only one instance do we feel that the collapse therapy had a direct bearing on the fatal outcome.

(This paper will appear in full in the *Journal of Thoracic Surgery*.)

DISCUSSION

DR. J. F. CORBETT: It is customary, in all operative cases, to institute hyperventilation following the operation. Would it have a tendency, in cases of tuberculosis, to aggravate the condition?

DR. T. J. KINSELLA: In answer to Dr. Corbett's question, we use hyperventilation in these patients where it is indicated but not as a routine measure. Deep breathing in the presence of active pulmonary tuberculosis is potentially dangerous. If circumstances demand the use of hyperventilation to prevent or treat a serious complication, or as an aid in the removal of secretions from the chest, then it must be used accepting the chance of a flareup of tuberculosis as being the lesser of two evils.

We do insist on frequent changes of posture, a daily raising of the individual's average amount of sputum and active motion of the extremities in all patients as a routine measure. Thus far pulmonary complications have been considerably less than we had anticipated.

DR. OWEN WANGENSTEIN: This instructive presentation of Dr. Kinsella well accentuates how great the respiratory reserve may be. At the same time it indicates that gradual accommodation is an important factor in the tolerance of pulmonary compression. The portion of Dr. Kinsella's study which is of most interest, I believe, concerns that group, with previous reduction of pulmonary ventilation by thoracoplasty or pneumothorax, subsequently submitted to laparotomy.

SUMMARY OF SURGERY DURING COLLAPSE THERAPY

Type of collapse	Surgery		Pregnancy	Anesthesia			Results	
	Major	Minor		Local	General	Spinal	Spread of Tuberculosis	Deaths
Unilateral pneumothorax	27	58	12	48	13	35	2	3
Bilateral pneumothorax	3	3	1	3	0	3	0	0
Phrenic nerve interruption	10	22	2	10	2	18	0	3
Thoracoplasty	22	23	5	21	11	18	2	2
Total	62	106	20	82	26	74	4	8

After an operation in the peritoneal cavity, there follows, for at least several days, a period during which the diaphragmatic component of respiration is almost obliterated. In the presence of previous contraction of thoracic expansion, it is somewhat surprising to see how well tolerated is the added burden of the considerably reduced abdominal component of respiration.

A few years ago a patient illustrating the importance of appraising carefully the significance of this factor came under my observation. A middle-aged hunchback, with a high grade of structural scoliosis of the spine, presented himself with a chronic intussusception of the pelvic colon due to a carcinoma of the sigmoid flexure. The thoracic cage was small and unusually deformed. The respirations were largely abdominal (diaphragmatic). A cecostomy was performed by one of my associates. Consequent upon the reduction of the diaphragmatic component of respiration incident to operation, cyanosis and difficulty in breathing developed soon after operation which remained refractory to treatment. The patient died without exhibiting (apart from the scoliosis) adequate pathologic effects to account for the reduction in pulmonary ventilation.

That patients, on the whole, however, with pulmonary compression withstand abdominal operations fairly well, as pointed out by Dr. Kinsella, is an important observation.

CANCER COMMITTEE PROGRAM

(Remarks made by chairman regarding April meeting)

DR. J. C. CORBETT: As you know, what is called the Cancer Committee has been authorized in this Society. The purpose of this committee is not at all to send propaganda to the public but to carry on an investigation aimed at dissemination of professional knowledge and, if possible, standardization of the treatment. Further, an attempt will be made to find out just what the status of treatment of cancer is with the profession at large.

Therefore, in a general way, it has been decided that a survey should be made of all the cases of cancer that were operated upon in 1933. Dr. I. Sivertsen has general supervision of this and there is one member from each hospital.

The next subject to be considered is, what are the

available resources for the treatment of cancer. How much radium is there available? How much x-ray is available? What general rules have been established for the treatment with radium and X-ray?

The third part of the program will be one in which we all will have to participate. That is, the report of five year cures. If a member of our society has had several breast cases in five years, he should report his five year cures as this group comes up for discussion, if possible, having microscopic sections and other material of that kind. When the subject of carcinoma of the stomach comes up, cures for that condition will be reported and so on, so each member may take part four or five times. We desire to give this subject the utmost consideration and it is a very important thing.

I do not know of any problem that concerns the general surgeon, particularly the men in general practice of surgery as most of us are, more than the cancer problem. Considering, for instance, the simple application of radium. We may have an operated case that is followed with radium. Some procedures are pretty well outlined. Cancer of the cervix has been quite well standardized, but there are other fields which are not so well established and the haphazard use of radium is not to be advised.

I think Dr. Nordland can perhaps accentuate that point a little more than I, because I must admit that when it comes to the application of radium to a tumor in some portions of the body I am at a loss to know just the most accepted technic.

We would like to have this meeting held in April and we want it to be a success.

DR. MARTIN NORDLAND: I have nothing to add except to emphasize what Dr. Corbett has said with reference to treatment of cancer in an accurate manner by the surgeon himself. The object of this future meeting will be to present to the society information concerning the proper use of radium. At the present time there is no well organized method of treating patients with cancer except at the University of Minnesota and at Rochester.

I believe it is possible for the surgeon himself to treat many cases of cancer effectively if proper methods are employed by him in the using of radium and radium emanations.

F. A. OLSON, M.D., *Secretary*.

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of December 13, 1933

The regular monthly meeting of the Minnesota Academy of Medicine was held on Wednesday evening, December 13, 1933, at the Town and Country Club. Dinner was served at 7 o'clock and the meeting was called to order at 8 o'clock by the President, Dr. C. D. Freeman.

There were 57 members and 3 visitors present.

Minutes of the November meeting were read and approved.

Dr. John Butler, of Minneapolis, was elected to active membership in the Academy.

The following officers were elected for the year 1934: President, Dr. Archa Wilcox, Minneapolis; vice president, Dr. Alexander R. Hall, Saint Paul; secretary-treasurer, Dr. R. T. LaVake, Minneapolis.

The scientific program followed.

PRACTICAL EXPERIMENTS IN WHAT ACTUALLY CONSTITUTES A GOOD CLINICAL RECORD

DR. HALBERT L. DUNN, Director of University Hospitals, read his Inaugural Thesis on this subject.

ABSTRACT

I. The goodness of facts in medical records should be considered as a variable factor. Certain facts can be gathered with comparative accuracy by clerks; others are variable from one time to another even when gathered by the clinician upon the same patient. The accuracy of any recorded fact in the history and the physical examination may vary not only with the existence or lack of adequate definition, but also with respect to who asks the fact, how it is asked, the kind of patient who is the subject, and the mental or physi-

cal condition of the patient at the time of questioning.

II. It is essential to appreciate the difference between what we might define as a clinical record and a medical data sheet. The clinical record is the ordinary record of the physician, in which he takes the routine history and physical examination. The medical data sheet is defined as an adaptation of the principles used in gathering data for tabulation applied to the needs of the physician. The essential differences between clinical record sheet and medical data sheet are identified in the accompanying table.

the whole profession, or to the clinical men outside the hospital. Of course in the hospitals the histories might be made differently, and I think that on the whole we pay too little attention to our histories in the hospitals. The intern takes the history and usually makes the diagnosis and sometimes it is not the diagnosis we would make, but we let it go rather than say anything about it. In many such cases we adapt ourselves to the hospital record, and we don't care particularly.

There would be a great deal of value in standardizing hospital statistics. As Dr. Dunn says, it might be

NEEDS TO BE FILLED BY RECORD	CLINICAL RECORD	MEDICAL DATA SHEET
1. Continuity	Rough order—Elimination of non-essentials	Exact order and fixation of facts
2. Order and sequence	Rough order—Arrangement of sheets	Exact order and fixation of facts—arrangement sheets
3. Conservation in Notation	Conserve doctor's time—shift to clerical and eliminate non-essential	Desirable—not at sacrifice of completeness Conservation a matter of cost
4. Condensation of record	Desirable	Desirable
5. Ready yield of information	Desirable for essential information only	Essential for all facts major and minor
6. Accuracy	Desirable	Desirable
7. Legibility	Essential	Essential
8. Expansibility and adaptability	Essential	Desirable—difficult to achieve
9. Completeness of notation	Summary note of important facts is sufficient	Essential for every item to be tabulated

III. After the problems of gathering the data have been met, it is essential to arrange for the tabulation and cross-indexing of certain facts. This function is usually considered to be the task of the record librarian. At the present time an experiment is being undertaken with regard to evaluating the possibilities of establishing a central statistical service unit which will permit the use of modern tabulating machinery for this very difficult hospital medical tabulating problem.

The ultimate goal of the program would be fourfold: (1) to promote a better cross-indexing of records for all participating hospitals at little, if any, additional costs over their present record expenditures; (2) to make possible economical tabulation for research, administrative, or professional purposes; (3) to create generalized inter-hospital statistics with respect to administrative, cost, purchasing and morbidity statistics; (4) to perpetuate a centralized group which would carry on the work of standardization between hospitals.

DISCUSSION

DR. J. S. GILFILLAN (St. Paul): I wonder if the members appreciate how important this subject is. I was glad to hear Dr. Dunn's differentiation between the clinical history and the data sheets. Most of us are not particularly interested in the data sheet, and most of our clinical histories are adapted to our immediate need. In regard to the different histories men take, a half a dozen men might take a history for the same disease and each one be a good history for the man who took it. For instance, if Dr. Schwyzer and I were each to take a history of a gallbladder case, I imagine they would be quite different and yet each one be good for the man who took it. My histories would be of no value to Dr. Dunn but they are pretty good for me—at least they are the best I can do for myself.

There is a great difference in this that we must appreciate, i.e., the value of the clinical history to the doctor who is taking it and also for the general records. The clinical histories might not be worth much for general records. It will be difficult to standardize these records. Perhaps it might be done for only certain diseases at first, so that they may be valuable to

done in epilepsy, asking the patients not only what they have but what they haven't. If a doctor asks the patient only about what he thinks the patient ought to have if he has epilepsy, then the record would not be particularly valuable to Dr. Dunn.

A NEW FLASHLIGHT POINTER, operated with batteries, was demonstrated by DR. HORACE NEWHART, Minneapolis, and he asked Dr. Nordland to use it in connection with the lantern slides shown in his paper.

THE DIAGNOSIS AND TREATMENT OF MALIGNANT TUMORS OF THE THYROID GLAND

A paper with the above title, by Dr. Martin Nordland and Dr. Lawrence M. Larson, of Minneapolis, was presented by Dr. Nordland. This was illustrated with lantern slides.

ABSTRACT

Malignant tumors of the thyroid are not extremely rare, when one considers numerous statistical studies showing that from 1 to 3 per cent of all nodular growths in this gland are carcinomata. However, it is only rarely that this type of malignancy is diagnosed preoperatively since a small single area in a benign nodule is involved early in the disease, but, on the contrary, when there is a hard fixed tumor, hoarseness, dyspnea, and immovable vocal cords, the nature of the condition is obvious. By this time metastases are likely to be extensive; in fact, they often occur so early in the disease that their origin may be obscure. It also has been shown that the outlook is not entirely hopeless when once the diagnosis of malignancy of the thyroid gland has been made. By the combination of surgery and radiation in the treatment of these lesions, 5-year cures have been obtained in as many as 43 per cent of cases (Pemberton).

CARCINOMA

Of thyroid neoplasms Pemberton found malignant adenomata to comprise 39 per cent, papillary adenocarcinomata 31 per cent, and the remaining 30 per cent to be largely made up of diffuse growths of the scir-

rhous type including a few of the spindle cell variety. The microscopic diagnosis of malignancy in the thyroid is not always easy even for a trained pathologist, since there is a great diversity of histologic features as well as a marked similarity to benign conditions. However, actual invasion by the neoplastic cells of blood vessels, if found, is a reliable criterion upon which to base a diagnosis of malignancy. If such invasion is not present, reliance must be placed on histologic changes in cellular structure.

It is not surprising to note that metastasis takes place early in this disease when one considers the rich blood supply to the gland, and its proximity to the lymphatics and large blood vessels. The incidence and extent of metastasis, however, varies greatly with the type of lesion and the degree of malignancy, it being noteworthy that the papillary type of growth frequently shows late metastasis and then only to the regional nodes. Highly malignant lesions, such as the spindle cell variety, are of rapid growth, produce early distant metastasis and usually prove to be speedily fatal. Therefore in the treatment of this condition, both the factors of extent of the growth and the histologic structure of the lesion must be kept in mind.

The symptoms of this disease are not always characteristic. These patients are usually in the fifth and sixth decades of life and in 90 per cent of cases there is a history of a preëxisting nodule or unilateral enlargement of the thyroid gland. A nodule such as this may suddenly enlarge, it usually becomes harder, more nodular and soon symptoms of tracheal compression or laryngeal involvement are present. Mediastinal or pulmonary extension may produce dyspnea but pain is frequently a late phenomenon. Pressure on the recurrent laryngeal nerve or direct extension of the growth into the trachea results in hoarseness and cough, and if the esophagus is encroached upon, dysphagia is present. Hoarseness is a significant symptom, since it usually means that the tumor has broken through the capsule and that the nerve is actually invaded and pressed upon. In non-malignant neck tumors, involvement of the recurrent laryngeal nerve is very rare. The question of the possibility of carcinomatous lesions of the thyroid producing hyperthyroidism has not been completely settled although Pemberton states that this condition practically never takes place. When there is enlargement of the gland along with a condition of hyperthyroidism, the presence of malignancy is very rare, although in Pemberton's series, 87 per cent of the cases of malignancy were associated with benign nodules elsewhere in the gland. It is these benign adenomata which are most likely the cause of the hyperthyroidism.

In many instances operations are undertaken for a supposedly benign adenomatous goiter only to find, by immediate microscopic examination or by recurrence of the lesion at a later date that neoplastic change had already taken place. Needless to say, it is in these cases that are not diagnosed clinically that the best results may be expected. This fact, however, is dependent upon the pathologist making a thorough search and reporting the presence of malignancy at the time of operation. Extension of the growth through the thyroid capsule, as evidenced by fixation of the gland, lymph node involvement or metastasis, usually precludes the possibility of cure or resection of the mass. When metastasis occurs, the incidence is in the following order: chest, bones (pelvis, clavicle, sternum, ribs, skull, knee, spine), and abdomen.

In the prophylactic removal of adenomata of the thyroid gland lies the greatest hope of cure of malignant lesions, since about 90 per cent of all these neoplasms occur in preëxisting nodules. After malignancy has been diagnosed, the treatment of choice is radical resection, and, if this is impossible, irradiation alone or combined with surgical removal is strongly indicated.

In early cases in which the carcinoma is confined within the capsule, removal of all of the growth without rupture of the capsule is sufficient. If there is no definite encapsulation, total removal of the affected lobe must be done. In still later cases, even though the growth is fixed, complete extirpation with subsequent irradiation should be done. At exploration, if the growth is found to be inoperable, radium needles may be buried in the tumor. These are attached to silk threads so that the surgical wound may be closed and the needles removed aseptically after the specified time has elapsed. In addition, a large rubber drainage tube should be left in the wound so that radium on a lead stem may be inserted into the depths during convalescence. In inoperable cases supplementary treatment is usually necessary, consisting of checkerboarding the region of the thyroid gland and applying radium in a mild erythema dose. High voltage roentgen ray treatment may also be used as a supplementary measure. By this method of treatment Pemberton and Fricke have effected a goodly percentage of cures.

In summary, it may be stated that surgery alone in this condition is usually not justifiable even if the malignant lesion is entirely removed, although in many instances radical resection has proved to be a satisfactory procedure. The latter is especially true of the papillary adenocarcinomata, which grow slowly and tend to remain encapsulated for a long time. In the more malignant types, radiotherapy certainly offers additional protection against the extension of the disease. Tracheotomy is frequently necessary, especially in the late stages of the disease, as a palliative measure.

The prognosis of carcinoma of the thyroid has been shown by Pemberton and Fricke and others to be as good as that of similar lesions of any other organ with the exception of the lip and the skin. Of 323 cases treated by them with a combination of surgery and irradiation, 5-year cures were effected in 43.9 per cent. Twenty per cent of these individuals lived ten years.

SARCOMA

Almost every conceivable type of sarcoma of the thyroid has been described, including the fibro-, chondro-, osteo-, lympho-, hemangio-sarcomata, and also the round, spindle and mixed cell variety. Metastatic sarcoma involving the thyroid gland has occurred but it is very rare.

Grossly, thyroid sarcomata are usually unilateral or median tumors; rarely do they produce a diffuse involvement of the gland. The rapidity of growth of these lesions is extremely variable depending upon their degree of malignancy. The more differentiated types, such as the fibrosarcomata, are of slow growth, while the more embryonic types, especially the round cell variety, enlarge rapidly, metastasize early and widely and death commonly takes place relatively soon after the onset of symptoms. Hemorrhages and necrosis are common in the latter type of case, and in some cases of this nature enlargement has been so rapid that the condition has simulated a phlegmon of the neck.

As the malignant tumor grows it invades adjacent tissues, the veins of the neck, the trachea, larynx, muscles, arteries, nerves and skin. The original contour of the gland soon becomes completely destroyed from extension of the growth. Symptoms of compression of the esophagus, of the trachea, and especially of the recurrent laryngeal nerve, early giving rise to hoarseness, are common. Death commonly occurs from respiratory difficulty due to edema and compression of the glottis.

Metastasis may be late, but usually it is early. The route by which it occurs is primarily through the blood stream, less frequently by way of the lymphatics; invasion of the thyroid veins within the goiter itself has been described along with the release of emboli directly into these veins, metastatic growths reaching primarily

the lungs, and secondarily the skeletal system, liver, kidneys and intestines. Frequently it is the case that metastasis dominates the picture while the primary focus remains relatively latent. Pulmonary metastasis often leads to erosion and perforation of blood vessels resulting in hemorrhages, pleural effusions, and so forth. These conditions may be confused with tuberculosis.

Sarcoma of the thyroid may occur in young individuals the same as it does in other locations of the body. According to most investigators sarcoma, and likewise, carcinoma, arises in about 90 per cent of cases in a preëxisting nodular goiter, usually in an individual in the fifth and sixth decades. As long as the growth remains inside the capsule, no symptoms are produced, so the exact time at which the malignancy begins cannot be determined. Pre-malignant conditions likewise are difficult in evaluation since they may exist for a long period and the exact time of their metamorphosis into malignant lesions cannot be determined. The goitrous enlargement is the only symptom of which the patient is aware.

DIFFERENTIAL DIAGNOSIS

In the differential diagnosis there are several conditions to be considered. The most noteworthy, although rare, is the so-called Riedel's struma, or woody thyroiditis. The etiology of this disease has been variously ascribed to tuberculosis, lues, and other types of chronic inflammation, but no convincing evidence of any of these factors has been presented. In this disease the gland is so hard that its consistence has been described as stony or like that of iron. However, its contour is smooth and rounded, the normal shape of the gland is retained, there is no hoarseness and there is little or no fixation of the gland to surrounding structures. There is no evidence of extension to regional nodes and distant organs. Malignant tumors are usually nodular and unilateral, they frequently metastasize early and soon involve the recurrent laryngeal nerves so that hoarseness and dyspnea are relatively common symptoms. The indications for surgical removal of the gland affected by woody thyroiditis consist mainly in pressure symptoms such as dyspnea and dysphagia. When surgery is undertaken for this disease, it should if possible be limited to partial resection of the gland, since as a rule very little functioning gland tissue is left and myxedema may result. Late in the disease myxedema is common but this may be controlled satisfactorily by the oral administration of thyroid gland extract.

Tuberculosis of the thyroid, while extremely rare and of little clinical importance, is occasionally confused with malignancy. It has been noted that tuberculosis occurs frequently in association with increased functional activity of the gland in distinction to malignancy which rarely invades a gland already involved with hyperthyroidism. The disease is most frequently a part of a generalized tuberculosis or secondary to an acid fast infection elsewhere in the body; the result may either be a frank abscess formation or a chronically inflamed fibrotic mass. Microscopically the latter type shows tubercles intra- or interfollicularly. The surgical treatment is incision of the abscess or lobectomy, depending upon the condition encountered. The prognosis is excellent, according to Rankin and Graham. From their studies, they could not conclusively determine whether the hypertrophic gland is rendered more susceptible to invasion by the bacillus of tuberculosis, or whether the infection stimulates the parenchyma to abnormal activity resulting in hyperthyroidism.

In the author's series of a total of eleven cases of malignancy of the thyroid (ten carcinomata, one sarcoma), there have been four apparently cured individuals who have lived respectively twenty months, three years, four and one-half years, and eight years. One

of these patients has almost a complete myxedema which necessitates daily doses of thyroid extract, but the other three individuals are normal in this respect. Deaths in the other seven cases took place up to the nineteen months postoperatively except that of the individual with sarcoma, who has extensive metastases four months after thyroidectomy.

DISCUSSION

DR. ARNOLD SCHWYZER (St. Paul): I want to congratulate the doctor on the number of interesting cases he had and on the fine sections he showed us tonight. In the treatment of carcinoma of the thyroid we should not rely on surgery alone, as carcinoma of the thyroid is mostly very radio-sensitive. I recall a case which was an extreme one. The patient had a goiter that came down 7 cm. below the clavicle on the outer surface of the chest wall. The elderly lady was in great misery and apparently it was a hopeless case. Nevertheless, we thought she would be better off if we operated, and we removed most of the mass and then inserted radium into the remaining part of the gland. She lived about two years, and for quite a while her neck looked surprisingly good. I follow this course in every case. They usually respond well. I think it is a good thing to apply x-ray treatment also.

The doctor mentioned the penetration of the blood vessels by the growth. I have seen that several times macroscopically at the operation. Microscopically it can be seen not infrequently. At times you may have only a suspicion before operation. The diagnosis usually comes to you if a goiter has existed for many years and then the patient has a little pain, with a rapid increase of the goiter, often an increase in the consistency. Later on the mobility is reduced, etc.

There is one condition of the thyroid that is easily mixed up with these cases, and that is a subacute thyroiditis, or rather strumitis. The patient may have some fever. I remember Kocher once wrote: How long will it take until our Swiss physicians will remember that point, that a slight fever with recent swelling in the thyroid does not always mean thyroiditis, but may mean carcinoma?

The fact that these growths often select to metastasize in the skull or manubrium sterni or ribs is well known. I remember a case my brother once had where the man came in with a large tumor mass on his head and an enlarged left lobe of the thyroid. He at once took the enormous skull tumor to be a metastasis of the thyroid, and so it was. Some of these metastases are of the appearance of colloid containing thyroid tissue, apparently normal gland tissue, and in the thyroid itself you can detect perhaps only some harmless looking adenoma.

I remember one case of von Eiselsberg, where he removed the whole thyroid. At that time we did not know anything about parathyroids. Myxedema followed, which cleared up when a tumor developed later in the manubrium sterni. When this had to be removed on account of dyspnea, the trouble reappeared. Thus these metastases can at times have some physiological function.

The doctor spoke of Riedel's struma. About three weeks ago we had a case in which the thyroid was exceedingly hard and fixed to the side of the trachea. There was nothing malignant in it. In some portions the glandular tissue seemed choked off entirely by fibrous material.

As I remember now, I have seen only one case of tuberculosis. They are very rare. That was in a woman patient whom I saw again this year for another condition. I operated upon her about eight or nine years ago. She also had some toxic symptoms with it. Our sections gave, however, not nearly as pretty a picture as those I have seen tonight. Tuberculosis of the thyroid is not always giving such an unmistak-

able picture under the microscope, and it may require several sections to come to a positive opinion.

DR. H. A. H. BOUMAN (Minneapolis): I was much impressed with Dr. Nordland's paper. It was because Dr. Arnold Schwyzer stimulated and aided me that I came to make the survey I did some years ago.

The metastatic colloid goiter cannot be distinguished from the ordinary goiter. I was in consultation in one case in which the doctor had operated behind the mastoid and he called it an aberrant goiter. Another patient I saw during August, 1926, in consultation, was a woman 63 or 64 years old who was sitting in bed at the hospital fighting for breath yet serenely undisturbed. She had big lips, thick skin, and was myxedematous. She had come in that day because her difficulty of breathing had come on more or less suddenly. I asked her doctor to aspirate the tumor protruding from her neck and soon after that she was relieved. He operated during the following September and removed a long sack from down below the sternum, which contained about three-fourths of a pint of blood clot. There was no more thyroid found. In sequence, the doctor gave this patient thyroid until about March, 1927, at which time he had to stop the extract as the woman had grown exceedingly nervous. I saw her again with him at the hospital in September, 1928, because of a return of the difficult breathing. She then presented a case of hyperthyroidism with an enormous broad neck which was coarsely nodular as seen from the front. Breathing was labored. Biopsy showed carcinoma. She died in December, 1928. This was degenerated goiter, myxedema, adenocarcinoma causing hyperthyroidism.

Kocher used to say that there were two signs to be especially considered as early signs: (1) an unaccounted for, more or less rapid, growth, in a previously quiescent goiter; (2) a change in the consistency of the struma—growing harder. At that time people did not believe there were so many malignancies. He had 400 in about 4,500 cases.

The classification of Kocher and Langhans was as follows: Struma proliferans; ordinary carcinoma; metastatic colloid goiter; parastruma; post-bronchial goiter of getzowa; papilloma and canceroid.

The proliferating goiter was much like Halsted's hyperplasia—an increased blood supply and vessels, change and growth of the epithelium, reciprocal alteration in size and contour of the follicles, and vanishing colloid; only the malignant nodule had a stellate scar in the center. I thank you.

DR. GUSTAV SCHWYZER (Minneapolis): I would like to ask Dr. Nordland whether anything new in the line of treating metastases of cancerous goiter has come out at the last goiter conference which he attended. I recall from Kocher's Clinic that the Russians, after excision of the primary thyroid carcinoma, advocated

that large doses of arsenic be given internally in order to check the metastases.

I remember one case in a middle-aged woman with a movable one-sided goiter the size of a goose egg, a goiter that did not pain her at all. She claimed she did not know of any increase in the size of the goiter during the last year before she came to us. At the same time she had a very soft manubrium sterni which could be pressed in without any pain and which rebounded into its place. Kocher at that time made a diagnosis of cancer in the goiter and removed the same. The goiter specimen showed in its middle a sarcomatous growth the size of a hazelnut.

The case my brother mentioned that I had years ago was in a man who showed a tremendously enlarged skull. Palpation of the bone caused a crackling sensation as if the top of the skull were composed of bone platelets. Dr. Clarke Stewart at the time asked me for my permission to show the case to his class at the University and I remember he presented the case as an osteosarcoma of the skull. I did not agree with his diagnosis and excised a small, one-sided goiter the size of a hen's egg. The patient never knew he had a goiter and therefore was unable to make any statement as to growth of the goiter. The cancerous degeneration was very evident under the microscope.

DR. NORDLAND (in closing): I want to thank the gentlemen for their discussions. While showing the slides, I neglected to discuss the treatment which is brought out in my paper and which agrees with Dr. Arnold Schwyzer's discussion. Radium plus resection of the lesion is the most effective weapon we have in the treatment of carcinoma of the thyroid. I think the combination of surgical removal and radium should be used. The suspected carcinoma of the thyroid should at least be explored just the same as carcinoma elsewhere and if the condition is found to be too serious a problem for surgical removal, radium can be applied within the wound or the wound may be closed and radium applied on the surface.

The treatment of the metastases referred to in Dr. Gustav Schwyzer's question is not settled. I am not familiar with any treatment with drugs and do not know of any better remedy than deep x-ray or radium therapy. In the treatment of malignancy of the thyroid, the best results will be obtained by early diagnosis and early radical resection. Adequate surgery alone will cure many adenocarcinomata of the papillary type which have not penetrated the capsule. Wide resection plus radium offers the best results in the majority of cases, while radium alone will often give surprisingly good results in those cases considered too extensive for surgical interference. Palliative tracheotomy will occasionally be necessary in some of the far advanced cases.

R. T. LAVAKE, M.D., *Secretary*.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

LIST OF PHYSICIANS LICENSED, MAY 22, 1933

(April Examination)

NAME	SCHOOL OF GRADUATION	ADDRESS
Addy, Edward Rezin.....	U. of Minn., M.B. 1931.....	517 E. 2nd St., Duluth, Minn.
Anderson, Nels Henry.....	U. of Minn., M.B. 1932; M.D. 1933.....	Bethesda Hospital, St. Paul, Minn.
Appell, Adolph Asher.....	U. of Toronto, M.D. 1929.....	Mayo Clinic, Rochester, Minn.
Burch, Hobart Alexander.....	Harvard Univ., M.D. 1929.....	504 4th St. S. W., Rochester, Minn.
Cain, Clark Leon.....	U. of Minn., M.B. 1932.....	Ancker Hospital, St. Paul, Minn.
Coate, Joseph Dalton.....	Indiana U., M.D. 1930.....	Mayo Clinic, Rochester, Minn.
Cragg, Richard Williams.....	U. of Cincinnati, M.B. 1930; M.D. 1931.....	Mayo Clinic, Rochester, Minn.
Davis, David Bennett.....	U. of Minn., M.B. 1933.....	Ancker Hospital, St. Paul, Minn.
Davis, Perk Lee.....	Temple Univ., M.D. 1928.....	Mayo Clinic, Rochester, Minn.
Deacon, Alfred Ernest.....	U. of Manitoba, M.D. 1929.....	Mayo Clinic, Rochester, Minn.

Greenfield, William Theo.....	U. of Minn., M.B. 1932.....	Fairview Hospital, Minneapolis, Minn.
Hankerson, Robert Geo.....	U. of Nebr., M.D. 1932.....	Hill City, Minn.
Heilman, Fordyce Russell.....	Northwestern U., M.B. 1930; M.D. 1931.....	Mayo Clinic, Rochester, Minn.
Holmen, Robert Winston.....	U. of Minn., M.B. 1932; M.D. 1933.....	University Hospital, Minneapolis, Minn.
Hynes, John Eldon, Jr.....	U. of Minn., M.B. 1931; M.D., 1932.....	500 Delaware St. S. E., Minneapolis, Minn.
Johnson, Karl Frederick.....	U. of Minn., M.B. 1931; M.D. 1932.....	1259 Edgerton St., St. Paul, Minn.
Loomis, George Lyman.....	U. of Minn., M.B. 1932.....	Miller Hospital, St. Paul, Minn.
Mack, Joseph John.....	U. of Minn., M.B. 1932.....	Ancker Hospital, St. Paul, Minn.
MacKinnon, Donald Charles.....	U. of Minn., M.B. and M.D. 1932.....	Mpls. Gen. Hospital, Minneapolis, Minn.
McKenzie, Charles Hugh.....	U. of Alberta, M.D., 1927.....	916 E. 15th St., Minneapolis, Minn.
Olson, Grant Edmund.....	U. of Minn., M.B., 1932.....	Ancker Hospital, St. Paul, Minn.
Parker, David Marcellus.....	U. of Minn., M.B. 1932.....	St. Mary's Hosp., Minneapolis, Minn.
Peterson, John Hartley.....	U. of Minn., M.B. 1932.....	Miller Hospital, St. Paul, Minn.
Petri, Karin Aileen.....	U. of Minn., M.B. 1932.....	University Hosp., Minneapolis, Minn.
Porter, George LeRoy.....	U. of Nebr., M.D. 1931.....	Mayo Clinic, Rochester, Minn.
Prins, Leo R.....	U. of Minn., M.B. 1932.....	St. Joseph's Hosp., St. Paul, Minn.
Sather, Russell Olav.....	U. of Minn., M.B. 1932.....	Mpls. Gen. Hosp., Minneapolis, Minn.
Siegmann, William Chauncey.....	U. of Minn., M.B. 1932.....	Swedish Hospital, Minneapolis, Minn.
Slavens, John Jacob.....	U. of Toronto, M.D. 1930.....	Dept. of Path., U. of Minn., Mpls., Minn.
Sorensen, Elmer Mork.....	U. of Minn., M.B. 1932.....	Ancker Hospital, St. Paul, Minn.
Watson, Sidney William.....	U. of Minn., M.B. 1932.....	Gillette Hospital, St. Paul, Minn.
Windsor, Robert Lloyd.....	Columbia U., M.D. 1932.....	Ancker Hospital, St. Paul, Minn.

BY RECIPROCITY

Ochsner, Clarence George.....	Washington U., M.D. 1931.....	411 Garfield Ave., Chicago, Ill.
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NATIONAL BOARD CREDENTIALS

Cole, John Gordon.....	U. of Minn., M.B. 1931; M.D. 1932.....	Redwood Falls, Minn.
Priest, Robert Edward.....	U. of Minn., M.B. 1931; M.D. 1932.....	1226 E. 4th St., Duluth, Minn.
Wagh, John McMaster.....	Rush Med. Col., M.D., 1932.....	Mayo Clinic, Rochester, Minn.

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

BOOKS RECEIVED FOR REVIEW

PROCEEDINGS OF THE 27TH ANNUAL CONVENTION OF THE ASSOCIATION OF LIFE INSURANCE PRESIDENTS. Held December 7 and 8, 1933. 259 pages.

THE PREGNANT WOMAN. Porter Brown, M.D. 174 pages. Price, cloth, \$2.00. New York: Eugenics Publishing Company, 1933.

TREATMENT OF THE COMMONER DISEASES. Lewellys F. Barker, M.D., Professor Emeritus of Medicine, Johns Hopkins University. 319 pages. Price, cloth, \$3.00. Philadelphia: J. B. Lippincott Company, 1934.

MENTAL HYGIENE IN THE COMMUNITY. Clara Bassett. Consultant in Psychiatric Social Work, Division on Community Clinics, The National Committee for Mental Hygiene, Inc. 394 pages. Price, cloth, \$3.50. New York: The Macmillan Company, 1934.

THE JOY OF LIVING. Dr. Franklin H. Martin. Garden City, N. Y.: Doubleday, Doran and Co., 1933.

The lives of comparatively few medical men merit autobiographies. Still fewer of these who have had interesting existences would be able to record happenings in an interesting way. Dr. Martin has had an interesting life and in his autobiography he relates his experiences in a charming manner.

The first volume reads like a novel and, beginning

with his parentage and childhood, records the struggle of a Wisconsin youth to obtain a medical education. The story of the founding of *Surgery, Gynecology and Obstetrics* and the American College of Surgeons is of special interest.

The second volume tells of Dr. Martin's personal experiences in Europe and the United States during the World War. The activities of the Advisory Commission of which he was a member and the Council of National Defense established by President Wilson some seven months before our participation in the World War are given in detail, and the recital gives a new slant on the part played by our government in the conflict.

TEXTBOOK OF PHYSICAL THERAPY. H. F. Wolf, M.D., et al. 409 pages. Illus. Price, \$5.50. New York: D. Appleton-Century Co., 1933.

Historically the application of physical agencies to the alleviation of pain, the improvement of function and the relief or cure of disease dates back to the beginnings of medicine and we find abundant proof of this in the earliest extant writings. Tracing its progress through the years we find that whatever merit it has possessed has been greatly hindered and handicapped by two powerful forces. It has been greatly over-exploited by its enthusiastic advocates and it has been utilized as the basis of many of the most flagrant examples of quackery in history. Obviously it has, for the moment, lent itself admirably to any method of cure wherein a powerful mental impression required the assistance of something tangible and yet at the same time deeply mysterious. The "King's Touch" was a good example in which deep-rooted belief amplified by superstition and emphasized by physical contact brought about at least mental relief, a simple illustration, it is true, but no different in its fundamentals from the more elaborate rituals and complicated machinery of later developments. As stated, this misuse of physical therapy has been its greatest handicap,

for thinking people have been reluctant to use and recognize its benefits under such circumstances.

On the other hand, a study of its development from the very beginning impresses one with the feeling that always has there been a studied effort to use physical therapy honestly and conscientiously, by those who recognized its limitations as well as its values and were willing to utilize it in its legitimate sphere without exaggerating its possibilities. It is into this picture that the present volume fits very nicely. The author has spent twenty serious years in its preparation and has produced a volume that must appeal to the judgment of those who are conservatively minded in their attitude toward this type of therapy. The first section, containing 114 pages, is devoted to consideration of the theory and principles; the last part, consisting of about 235 pages, covers a wide range of practical application of physical therapeutic measures. No attempt is made to include any treatment by x-rays or radium.

To those who are willing to accord its proper values as an adjuvant and not a cure-all, that diagnosis and a good knowledge of pathology are fundamentally necessary, the use of physical therapy offers a wide scope of helpfulness and this book can be cordially recommended as a safe and yet highly informative guide.

GILBERT COTTAM.

THE TECHNIC OF LOCAL ANESTHESIA.

Arthur E. Hertzler, M.D. 5th ed. 292 pp. Illus. \$5.00. St. Louis, Mosby, 1933.

I read the fifth edition of Hertzler's "Local Anesthesia" with interest, pleasure and profit. The thinner paper makes a neater book and a smaller one, although about ten pages have been added. The conservative attitude of the book, giving limitations and indications for the use of local anesthesia, and the new chapters on spinal and intravenous anesthesia help to round out the volume and bring it up to date. This helps to make it especially valuable to the beginner.

To an enthusiastic user of local anesthesia the book

is refreshing in the personal slant given to many of the paragraphs. There is too much tendency to be pedantic and repetitious in most books, and this is notably lacking in this volume. I can recommend it highly to the beginner as well as to the more experienced surgeon.

O. I. SOHLBERG, M.D.

A NEW APPROACH TO DIETETIC THERAPY

Eugene Foldes, M.D. 434 pages. Illus. Boston; R. G. Dadger, 1933.

In this monograph, Dr. Foldes has elaborated the thesis that certain diseases are caused by disturbances in the distribution and movement of water and minerals, mainly retention of water. He devotes several chapters to general considerations of diet, gastro-intestinal tract, internal secretions, circulations, respiration, acid-base balance and kidneys. Most of the book is spent in explaining various diseases including epilepsy, eclampsia, migraine, angina pectoris, asthma and allergic diseases, gout, essential hypertension, blood diseases, including pernicious anemia, acne vulgaris and constitutional disposition and aging. The last part of the book gives directions as to diet and drugs in the treatment of these diseases, mainly aiming to avoid retention of water and minerals.

The book as a whole is an indication of the increasing interest in water and mineral metabolism which has rather been neglected until late years. It is a little difficult to read and there are ideas expressed which seem in conflict with a number of commonly accepted facts, particularly in regard to the cause and treatment of pernicious anemia and peptic ulcers.

In short, this is a monograph of interest to those especially interested in diets as such and who want to know all theories of disease and of therapy. However, it is not to be recommended to those who have not already a fairly wide knowledge of medicine and therapy.

H. B. SWEETSER, JR.

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No. 3

THE PRESENT STATUS OF TREATMENT OF CARCINOMA OF THE BLADDER*

VIRGIL S. COUNSELLER, M.D.
Rochester, Minnesota

DIVERGENCE of opinion concerning the type of treatment to be applied to malignant tumors of the urinary bladder is due chiefly to the fact that there has been no standard classification as to type, and degree of malignancy of these tumors and no accepted plan for their surgical removal. However, in recent years the urologist has succeeded in perfecting diagnostic methods and transurethral surgical procedures so that now satisfactory information may be obtained concerning size, situation, type, and degree of malignancy, thereby making it possible to plan quite accurately the method of surgical treatment best suited to the individual case.

Electrocoagulation, radium, segmental resection and excision, and total cystectomy all have been employed in the treatment of malignant lesions of the bladder, but it is difficult to evaluate procedures except those in the hands of individual surgeons. Certain opinions may be obtained by comparing the results of various surgeons using the same technic, provided cases are accurately classified with regard to site of the lesion, degree of malignancy and extent of vesical involvement. Obviously the operation of choice by one surgeon may not be that of another. For instance, Corbus and O'Conner advocate destruction of the tumor by electrocoagulation; Barringer and Dean treat the tumors almost exclusively by radium, whereas Judd, Chute, Hunt, Beer and Bugbee advocate radical surgical removal of the lesions whenever advisable. André and Grandineau, at the French Urological Con-

gress in Paris in 1932 expressed the general opinion that surgical removal gave the most favorable results and that radium, roentgen-rays and diathermy should be regarded as palliative measures in inoperable cases.

Corbus stated his belief that a particular method should be mastered, adhered to, and all others excluded. His favorable results with electrocoagulation lend some support to this contention, but I believe most surgeons will agree with Bugbee that the type of treatment should be determined by the condition found in the individual case; it may include radical excision, electrocoagulation, implantation of radium, or a combination of these procedures plus the possible use of high voltage roentgen rays postoperatively.

Factors which must be determined and which govern the type of treatment of carcinoma of the bladder are the size and situation of the lesion, and the type and degree of malignancy. It is the policy at The Mayo Clinic to apply the surgical procedures indicated after the foregoing factors have been ascertained. I shall, therefore, review briefly the salient points in establishing the diagnosis, and the surgical treatment in such cases.

DIAGNOSIS

The diagnosis of carcinoma of the bladder can be made accurately only by the aid of a cystoscope and microscopic examination of a specimen removed. Even this may fail if infection, which not infrequently complicates carcinoma, is extensive, and specimens removed may disclose inflammation only. In such cases it is wise to open the bladder from above for direct inspection and microscopic study of multiple areas rather than to continue to treat the bladder for cystitis. If carcinoma is coexistent with infection, it is usual-

*From the Division of Surgery, The Mayo Clinic, Rochester, Minnesota. Read before the meeting of The Minnesota Surgical Society at the annual meeting of The Minnesota State Medical Association, Rochester, Minnesota, May 22, 1933; also, before the meeting of The Northern Minnesota Medical Association, Willmar, Minnesota, September 8, 1933.

ly highly malignant and early treatment is urgent. Hematuria is the most common symptom of carcinoma of the bladder but is not diagnostic, since lesions of the kidney, ureter and prostate gland may present the same symptom. Hematuria associated with frequency and dysuria are quite significant, and complete cystoscopic examination is essential. Early and accurate diagnosis at the onset of symptoms is certainly one of the most important factors in reducing the high mortality rate and improving the end-results. Too many of these patients delay seeking medical advice and thereby materially reduce their chances for permanent cure. Hunt reviewed fifty-one cases in which the disease had advanced so far that it was not thought advisable to attempt any form of treatment. He found that the average duration of symptoms previous to the patients' admission to the clinic was almost two years. Disregarding the lesions which are amenable to transurethral electrocoagulation, he estimated the inoperability of the major malignant lesions at not less than 25 per cent. Bumpus found, in a review of 465 cases of tumor of the bladder treated by suprapubic exploration, that it was not possible or advisable to institute any form of treatment in sixty-six cases.

Obstruction in the median lobe of the prostate gland occasionally produces hematuria from congestion, but this should not mislead the observer since only a small proportion of such lesions bleed and not infrequently carcinoma of the bladder is associated with obstruction of the prostate gland. If hypertrophy of the prostate gland is present, cystoscopic examination is difficult, and the exact situation and size of the tumor may not be accurately determined.

If the diagnosis of infiltration of the wall of the bladder remains doubtful after cystoscopic examination, the cystogram usually will reveal a filling defect in the wall. But, as Kretschmer has pointed out, if the malignancy is principally in the periphery of a papilloma without much involvement of its pedicle, the cystogram might be negative. If the base of the tumor cannot be seen, it is not safe to estimate the operability of the growth, since it may fill the entire bladder and yet originate from a small pedicle without infiltration of its walls. Microscopic examination of specimens removed through the cystoscope gives accurate and final information as to the character of the tumor.

CLASSIFICATION AND GRADING OF TUMORS OF THE BLADDER

As has been stated, there is no uniform classification of tumors of the bladder nor is there agreement as to the degree of malignancy. Various observers, who have studied these tumors for many years, both clinically and pathologically, agree that they should be classified as follows: (1) papilloma graded 1, (2) papillary carcinoma, and (3) infiltrating carcinoma. Many observers, however, believe that the benignancy of the so-called papilloma of the bladder is only relative. Points of distinction are often difficult to evaluate and therefore the tumors are classified according to the experience of individual observers. A significant point in formulating an opinion regarding papillomas of the bladder, as Caylor has stated, is that some of them may implant themselves in other parts of the organ or in a suprapubic wound following an open operation, or they may recur locally, which is also a characteristic feature of epithelioma of the bladder. The fact that 95 per cent of all tumors of the bladder are epitheliomas is certainly significant, and suggests that the so-called papilloma is not far removed from a true epithelioma.

Broders, in 1920, presented a classification for grading the potential malignancy of epithelioma. He stated that a neoplasm can accomplish only what its cells can accomplish, and if these are active then the tumor is active. His classification is based on the degree of differentiation of cells. Broders asserts that by this differentiation the cells are able to check their own growth, which means that highly differentiated cells indicate low grade malignancy whereas undifferentiated cells indicate a high grade of malignancy. The variations in the degree of malignancy he designated by grades 1 to 4, the former being low and the latter high. Clinical experience with epitheliomas of the bladder as well as of other regions of the body in the last thirteen years in The Mayo Clinic conforms with that of Broders' classification of the degree of malignancy. In a considerable percentage of cases the urologist is able to estimate the degree of malignancy at cystoscopic examination from the gross appearance of the tumor. Tumors graded 3 or 4 frequently grow so rapidly that their blood supply is disturbed and they become necrotic. Because of the difference in rate of growth of epitheliomas of the bladder and the slight difference between the

so-called papilloma and the low grade papillary carcinoma as seen at The Mayo Clinic, I believe it wisest to consider all tumors of the bladder as potentially malignant and to treat them as such.

The situation of tumors of the bladder with respect to the lateral walls, dome, base and trigone, is significant with regard to the degree of malignancy. Apparently there is a tendency for

The more extensive highly malignant lesions and the widespread lesions of low grade malignancy are attacked by the suprapubic route, using segmental resection with disposition of the ureter when it is involved, excision, electrocoagulation, insertion of gold radon seeds or platinum-iridium needles, containing 1 mg. of radium sulphate (element), about 1 cm. apart around

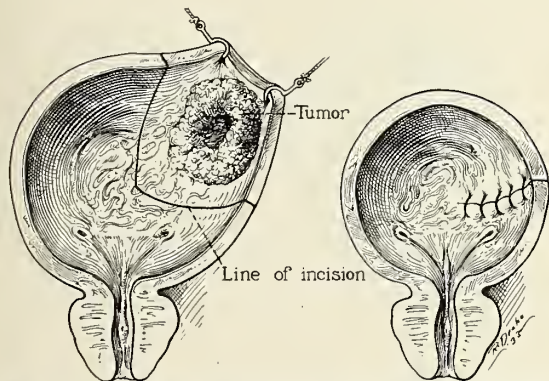


Fig. 1. Patient aged fifty-six years. Squamous cell epithelioma, graded 4. Dysuria, hematuria and cloudy urine had been present for one year. Segmental resection was done. Roentgen treatment for four hours after operation. Condition good at time of dismissal.

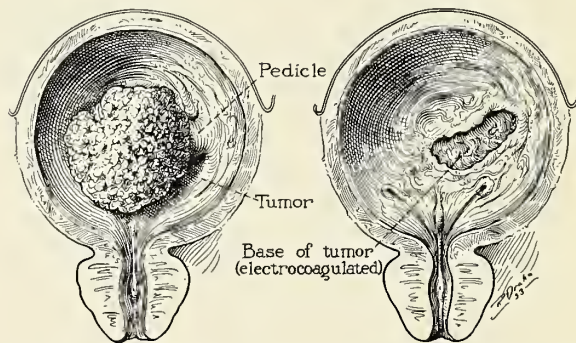


Fig. 2. Patient aged fifty-three years. Papillary squamous cell epithelioma, graded 3. Hematuria, nocturia and dysuria had been present for one year. Excision and electrocoagulation was done. Roentgen treatment for four hours after operation. Condition good at time of dismissal.

the development of highly malignant epitheliomas in the base and for a less malignant growth on the lateral walls and dome. Hunt found in a series of 150 epitheliomas of the base that the incidence of a high degree of malignancy (graded 3 or 4) was 64.6 per cent, as opposed to 53.6 per cent of 214 epitheliomas of the lateral walls and dome.

SURGICAL TREATMENT

Appropriate surgical treatment can be instituted only after the grade of malignancy, the size of the lesion and its situation have been determined. There are two avenues of approach, the transurethral and the suprapubic. At The Mayo Clinic it has been the practice when the tumor is comparatively small and the malignancy graded 1 to 2, to destroy the growth by transurethral electrocoagulation. However, with recent improvement in transurethral procedures small lesions, graded 3 or 4, that are easily visualized and which have not as yet infiltrated the wall of the bladder to a marked degree, have been treated in the same way. This method may be combined with the use of gold radon seeds. If such lesions can be treated successfully by this method, it is of distinct advantage since the risk is small and the period of hospitalization is shorter.

the margin of the lesion and across the electrocoagulated surface, and a combination of these procedures.

The highest percentage of operable lesions are in the dome and lateral walls, and therefore, are more suitable for segmental resection or local excision. If the lesion is graded 3 or 4, it is practically always of the infiltrating type and involves not only the wall of the bladder but the tissues adjacent to the bladder and the peritoneum. In such cases Judd advises opening the peritoneum so that the extent of the peritoneal involvement can be visualized and the lesion disposed of by segmental resection. Crenshaw has called attention to submucosal infiltration of highly malignant lesions, which in some instances is productive of bulbous edema around the margin of the tumor due to the disturbance of the vascular supply to the wall of the bladder. On this account, wide excision or resection should be performed with the cautery knife to include a margin of at least 1 cm. of normal vesical wall around the lesion (Fig. 1). Hunt reported a series of 214 cases in which the tumors were in this situation. Segmental resection was done in 114 cases with eleven deaths, a mortality of 10 per cent as opposed to seven deaths following various types of excision in 100 cases.

Excision is more applicable to tumors of low grade of malignancy since they are not usually infiltrating and seldom involve more than the mucosa. Frequently it is advisable to combine excision with electrocoagulation of the adjacent vesical wall, particularly if the site of attachment is unusually large, as further protection against local recurrence (Fig. 2).

to the irritating deformity sometimes seen following resection. He reported favorable results from its use in all situations in the bladder, and regards it as the surgical procedure of choice. It has been used in The Mayo Clinic since January, 1925, with satisfactory results, not only for small lesions of low-grade malignancy but for trans-vesical electrocoagulation of inoperable lesions

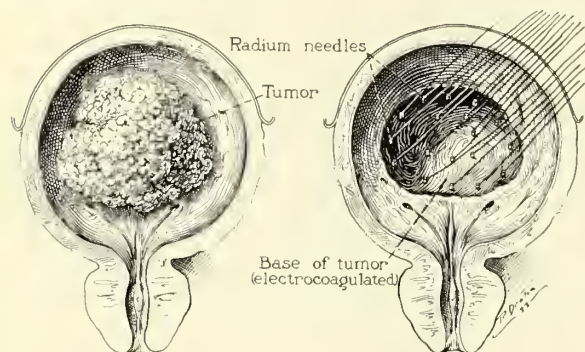


Fig. 3. Patient, aged sixty-four years. Papillary squamous cell epithelioma, graded 4. Dysuria, hematuria and low abdominal pain had been present for one month. Excision, electrocoagulation and insertion of radium needles equivalent to 816 mg. hours. Condition good at time of dismissal.

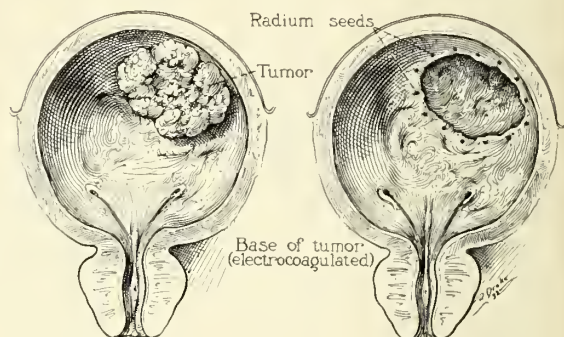


Fig. 4. Combination of excision, electrocoagulation and insertion of radium seeds.

Lesions which involve the base of the bladder present the most difficult problem, and opinions differ widely as to the correct treatment. Many are inoperable at the time of examination. These are usually graded 3 or 4 and involve one or both ureters or the urethral meatus, and are of the infiltrating type. If segmental resection is to be done, the ureter must be disposed of either by ligation or reimplantation. In a series of fifty-two cases at The Mayo Clinic in which resection was done with ureteral ligation, the mortality was 13.4 per cent, whereas in forty-seven cases in which the ureter was reimplanted the mortality was 32 per cent. Beer gives a mortality of 21 per cent in thirty-seven cases with or without transplantation of the ureter, and 43 per cent recurrences. Because of the poor surgical results from resection, other methods have been employed in a larger number of cases.

Since the introduction of electrocoagulation by Beer in 1910, its use has been extended to treat not only the small lesions with low-grade malignancy, but those inoperable lesions of high-grade malignancy at the base of the bladder. Corbus applied electrocoagulation in experimental work on the bladders of dogs. He demonstrated that the capacity of the bladder was not reduced and the wall remained smooth and elastic as opposed

of high-grade malignancy of the base of the bladder. In a recent study of 165 patients with malignant lesions of the bladder who lived five years or longer following various surgical procedures, I found that seventeen of the 165 lesions involved the base of the bladder and were considered nonresectable. The lesions were treated by electrocoagulation, and fifteen patients (88 per cent) are alive and free from vesical symptoms.

Electrocoagulation may be effectively combined with the use of radium needles, or seeds, particularly when lesions of high-grade malignancy have extensively infiltrated the base and trigone or the wall of the bladder and resection is not advisable (Figs. 3 and 4).

Barringer advises the use of radium alone as the most satisfactory treatment. He reported fifteen cases of papillary carcinoma in a series of twenty-three in which radium alone was used. The patients were free from symptoms of the disease, as opposed to eighteen patients in a series of sixty-one with infiltrating lesions. Certainly this is a commendable record and serves to emphasize the value of radium when properly applied in the treatment of malignant lesions of the bladder. Furthermore, since excellent results have been reported with electrocoagulation and radium separately, it would seem that even better results should be obtained by their combined use.

Barringer uses one gold seed of 2 millicurie to each square cubic millimeter of surface of the lesion. The papillary portion of the tumor should be removed by the cautery, then the radium accurately placed on the exposed surface of the bladder.

Total cystectomy for malignant lesions involving the base and trigone of the bladder has been recommended by Judd, Coffey, Chute and others, but the risk of the operation so greatly exceeds the chances of cure that its advisability hardly seems justified.

The best results should be secured when lesions are of a low grade of malignancy, without infection, but the chances of cure by electrocoagulation and radium in all grades and situations, considerably exceed total cystectomy and transplantation of the ureters, although Coffey reported several cases in which he performed, simultaneously, transplantation of the ureters into the sigmoid and total cystectomy successfully. Continued improvements in the technic may give more favorable results with this procedure. The degree of malignancy will never change, therefore it must be remembered that lesions graded 3 or 4 extend early and rapidly through the wall of the bladder and involve the perivesical tissues, including one or both ureters, the rectum, prostate gland and seminal vesicles.

RECURRENCES

Regardless of the method of removal, post-operative recurrence or extension of the malignant growth may take place in the form of implants, either before or after operation, or by direct extension beyond the tissue removed, or along the lymphatic vessels. In 1932 I studied cases of recurrence of tumor of the bladder according to the grade of malignancy. The percentage of recurrences of all grades of lesions was rather uniform. Sixty-seven patients had recurrences but had lived five years or more. Fifteen of the sixty-seven had recurrent growths graded 1; thirty-three had recurrent growths graded 2; eleven had recurrent growths graded 3; and four had recurrent growths graded 4. Recurrence after radical excision or electrocoagulation of a growth of low-grade malignancy is not so likely to occur as it is following the same procedure for a growth graded 3 or 4.

For many years at The Mayo Clinic all such patients have been requested to return in three months for a checkup on the condition of the

bladder, then again in three months, then in six months and then in one year. If they are free from recurrences at the end of this period, they are dismissed from observation. In this manner many recurrent growths are discovered and destroyed by transurethral electrocoagulation before symptoms develop, thereby making it possible greatly to improve the end results. Unfortunately some patients disregard the follow-up note, and fail to return until there is extensive local recurrence requiring secondary transvesical surgical procedures. Of the group of sixty-seven patients who had recurrence and returned for check-up and treatment, 75 per cent are alive and free from symptoms referable to the bladder.

The end results in this disease will continue to improve if the surgical procedures applied are selected according to the degree of malignancy, the situation, and the extent of the lesion. Some form of follow-up system is essential if the recurrent growths are to be eliminated before they become extensive and inoperable.

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THE OPERABILITY OF TUMORS OF THE SPINAL CORD*

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TUMORS of the spinal cord are predominantly benign and operable. The symptoms are produced by compression of the cord within its bony canal and consist in motor and sensory changes below the site of compression. Symptoms can be relieved only by operation, and the extent and permanency of relief depends on the type and situation of the tumor encountered, as well as on the amount and duration of the compression. Early diagnosis and operation are followed by excellent clinical results, due to the fact that by far the greater number of tumors are not malignant and are removable.

Tumors compressing or involving the spinal cord may arise from the bony structures of the vertebral column or from any of the tissues surrounding or constituting the spinal cord (Table I).

For convenience, these tumors are divided into three classes according to their anatomic relations to the cord. Those which arise external to the meningeal coverings of the cord are designated as extrameningeal. Those which arise within the meninges but which do not invade the cord are called intrameningeal, and those which arise from the structures of, or within the cord are termed medullary.

For the purpose of estimating operability, a series of 392 tumors of the spinal cord which have been completely or partially removed at The Mayo Clinic and which have been verified pathologically, has been reviewed. In a previous paper it has been emphasized that any type of tumor may occur at any level, and that no particular type is more frequently found in one portion than in another. It is interesting to note, also, that no particular segment shows any predilection for the development of tumors. The apparent preponderance of tumors in the thoracic segments is due to the relative length of the spinal cord in this region. The segmental level of tumors in the series studied was as follows: cervical, 13 per cent; cervicothoracic, 10 per cent; thoracic, 50 per cent; thoracolumbar, 10 per cent; lumbar, 13 per cent; lumbosacral, 3 per cent, and sacral, 1 per cent.

In the entire group of 392 tumors, ninety-seven, or 24 per cent, were found at operation to be external to the meninges and consequently were classified as extrameningeal. Of this group, only ten were metastatic, and examination of the pathologic diagnoses revealed that the majority of these tumors were benign and amenable to surgical removal. The pathologic diagnoses, and the number of tumors of each type were as follows: neurofibroma, twenty-four; fibrochondroma, ten; osteosarcoma, seven;

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TABLE I. TUMORS OF THE SPINAL CORD AND THEIR ORIGIN

Origin		
Extrameningeal tissue	Vertebrae	<ul style="list-style-type: none"> Osteoma Chondroma Osteosarcoma Fibrochondroma Fibromyxochondroma Giant cell tumor Hypertrophic osteitis
	Extradural fat	<ul style="list-style-type: none"> Lipoma Lymphosarcoma Fibrosarcoma Hypernephroma Tuberculoma Fibroma Metastasis
	Spinal nerve	Neurofibroma
	Blood vessels	<ul style="list-style-type: none"> Hemangioma Hemangio-endothelioma
Intrameningeal tissue		<ul style="list-style-type: none"> Endothelioma Neurofibroma Hemangioma Fibrochondroma Fibroma Ependymoma (filum) Hemangio-endothelioma Varicosity
Medullary tissue		<ul style="list-style-type: none"> Glioma Ependymoma Hemangioma Fibroma Fibrolipoma Neurofibroma Sarcoma Carcinoma metastasis Cysts

hemangioma, six; hypertrophic osteitis, seven; myeloma, five; fibroma, six; hemangio-endothelioma, six; osteoma, three; giant cell tumor, four; tuberculoma, four; lymphosarcoma, four; fibrosarcoma (metastatic), five; hypernephroma (metastatic), two; carcinoma (metastatic), two, and glioma, two.

The largest and most important group of tumors are those which arise within the meninges and involve the spinal cord only by compression. Fifty-two per cent of the entire group of 392 tumors were found in this situation. A review of the pathologic characteristics of these tumors demonstrated that by far the greater majority of them were either endotheliomas or neurofibromas and that even the ependymomas were completely removable when encapsulated and confined to the filum terminale. Throughout this series the term endothelioma refers to the tumors which have been designated as arachnoid fibroblastomas, psammomas or leptomeningiomas, and the term neurofibroma to perineural fibroblastomas. The intrameningeal tumors, representing 205 cases, were classified as follows:

endothelioma, ninety-five; neurofibroma, seventy-seven; hemangioma, eight; fibrochondroma, two; fibroma, four; ependymoma (filum), thirteen; hemangio-endothelioma, two, and varicosities, four.

In the two preceding groups the surgical problem was that of relieving the compression on the spinal cord without producing trauma to the already compressed cord. However, in the third, or medullary group of tumors, of which there are ninety, an entirely different surgical problem was encountered. Here we were dealing with pressure on the cord from within outwards, and before radical removal could be accomplished it was necessary further to traumatize the cord by incising it. With great care, the more benign type could be completely or partially removed, and when the more malignant types of tumor were encountered, the relief of compression was often followed by palliation of symptoms. In this group, tumors primary in the spinal cord predominated, and for the most part belonged to the group of gliomas. This complicated the prognosis in view of the fact

that even complete removal might be followed by recurrence. The ninety medullary tumors were classified as follows: glioma, thirty-seven; ependymoma, nineteen; hemangioma, seven; fibroma, six; carcinoma (metastatic), three; sarcoma, two; hemangio-endothelioma (complete removal), two; endothelioma, two; fibrolipoma, one; neurofibroma, four; and cysts, seven.

The danger incident to laminectomy depends primarily on the general condition of the patient. But regardless of age, sex, situation and type of tumor, as well as the general condition of the patient, the operative mortality in the last four years has been but 4 per cent. It is interesting to note that in the period previous to the last four years the mortality averaged 8 per cent. This earlier period included all of the cases which were encountered before the modern technic had been perfected, and also cases in which the condition had progressed to the point of extreme risk. The mortality among patients encountered in the last four years would seem to give a fairer estimate of the specific mortality for the group.

It is apparent that the majority of tumors of the spinal cord are capable of being removed at operation. However, it would seem only fair to include within the scope of operability not only removal of the tumor but relief of symptoms and resumption of normal function below the site of compression. Extreme compression over a comparatively short time does not preclude return of function; however, marked compression over a longer period of time influences the extent and rapidity of the return of function. Clinical observation following operation indicates that when loss of function is 25 per cent, it is usually recovered in three months; a 50 per cent loss requires from six to twelve months, a 75 per cent loss about eighteen months, while a total loss of function requires at least two years, and the injury to the cord may be so extensive that recovery will never take place. It is logical to suppose that long continued compression of the spinal cord produces interference with the blood supply and altered metabolism of the spinal cord, which, if allowed to persist, will produce permanent degenerative changes. In order to determine the nature of such changes, experiments were carried out on dogs in which the clinical progress of compression of the spinal

cord by tumors was duplicated as nearly as possible with artificial tumors. The tumors were allowed to remain in place for such a time as was necessary for complete paralysis to take place, and after an interval, the tumors were removed. In one series, the paralysis cleared up, and in another, it persisted. The cords were examined, and if the symptoms had been relieved by the secondary operation, there was little evidence of degeneration, but if the paralysis had persisted, there was definite cystic degeneration within the spinal cord.

These experiments explained why symptoms tend to persist after spinal cord tumors have been removed, and why some spinal cords are permanently injured following long periods of compression, and why normal function is not restored after operation.

The operability of tumors of the spinal cord should also embrace the question of recurrence of tumors removed at operation. The tendency for recurrence of primary tumors incapable of being completely removed, malignant lesions either primary or metastatic, and benign lesions incompletely removed, is very evident. We were very much interested in reviewing the entire group of 392 cases to determine, if possible, the tendency of the removable benign lesions to recur. Five such cases were found and these consisted of four neurofibromas and one endothelioma.

The endotheliomas of the spinal cord are similar to the intracranial meningiomas, in that they have a base or attachment to the meninges. Because these tumors are benign, complete removal would be expected to prevent recurrence, but whenever some of the base is left behind, then a nucleus for re-formation remains, and in one case in which there was recurrence of an endothelioma this apparently was the cause.

A woman was operated on for an intrameningeal endothelioma which was found in the lower lumbar region and the base or attachment was very broad. No difficulty was encountered in complete removal, and the patient recovered and remained free of symptoms for about eighteen months. She returned for examination, and a second operation was performed, at which time recurrence was found at the same site, and the growth was much larger. Both tumors proved to be endotheliomas.

Neurofibromas are benign fibrous tumors and do not tend to recur unless some of the tumor tissue is not removed at the first operation. In the three cases in which there was recurrence, tumor tissue apparently was left behind, although at the time of operation the field appeared free from residue. The first case was that of a man aged thirty-eight years, who was found to have an extrameningeal neurofibroma in the upper thoracic region. The tumor seemed to be well isolated and was easily removed. He was perfectly well for one year, when symptoms developed which indicated recurrence. At the second operation, another neurofibroma, situated extrameningeally, was found at the previous site. When removal was attempted, extension through the intervertebral foramina was found and the portion outside the vertebral canal was as large as that within. The supposition is that at the time of the first operation there was a small, extravertebral portion, with a small connection simulating a nerve root. This emphasizes the necessity for very careful roentgenograms of the spinal column, because more than 40 per cent of neurofibromas of the spinal cord give evidence of erosion, and whenever a so-called dumb-bell neurofibroma is suspected, careful scrutiny of the roentgenograms might obviate the chance of missing a small, extravertebral portion. The second case of recurrence occurred in a man aged twenty-seven years, who was found to have a small, discrete, intrameningeal neurofibroma in the cervical region. It was completely removed, but, similar to the previous case, must have had a small attachment, with a small extrameningeal tumor, for, although the man was completely relieved of all symptoms after his operation, return of his trouble fifteen months afterwards indicated recurrence. At the second operation, a well defined extrameningeal neurofibroma was found, and was removed, since which time the patient has been free of symptoms. The third case was that of a young woman who came to the clinic one year after an operation elsewhere, for removal of an extrameningeal neurofibroma. A second tumor was removed and proved to be a neurofibroma situated external to the meninges. The next year a second recurrence necessitated another operation elsewhere, and the report was

that of neurofibroma. When the patient's symptoms returned for a third time, she came back for her fourth operation and an extensive neurofibroma was found outside the meninges, extending through two intervertebral foramina, with a very small portion of the tumor outside the vertebral canal. Here again there must have been a small residue of tumor remaining at each operation, but in this particular case, there was no evidence of bony erosion in the roentgenogram. From our observations it would seem that recurrence is to be expected in the malignant types of tumor, but in the benign types and especially the prevailing endotheliomas and neurofibromas, recurrence takes place only when complete removal has not been effected. This may result when the meningeal attachment of the endotheliomas is not removed with the tumor, or when a small extension of a neurofibroma is overlooked and left behind at the time of operation.

CONCLUSIONS

The majority of the tumors of the spinal cord are benign and operable. They may arise from the tissues of the vertebral column, spinal canal, meninges, and spinal cord, at any segmental level. For convenience they are divided into extrameningeal, intrameningeal, and medullary types of tumors, depending on their position in regard to the spinal cord. Of 392 tumors of the spinal cord, 302 were extramedullary and involved the spinal cord only by compression. The remaining ninety were primarily in the cord although some few were benign in nature and were removed. The mortality for the entire group was 4 per cent.

Relief of symptoms depends on the amount and duration of compression, for long compression tends to bring about vascular and metabolic changes within the cord, producing permanent degenerative changes, which in turn prevent a return to normal. Recurrences appear whenever the tumor is malignant and incompletely removed, and in the more prevalent benign group of endotheliomas and neurofibromas, whenever the base of one and extensions of the other are not removed. The entire group of 392 cases of tumors of the spinal cord have been analyzed from the standpoint of operability.

FERTILITY AND STERILITY IN THE MENSTRUAL CYCLE*

WITH DEMONSTRATION OF A NEW SLIDE RULE

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IT is now fairly well established that menstruation occurs as the result of failure of the ovum to be fertilized. Once during each menstrual cycle in a normal woman a matured ovum is extruded from the ovary, completing what we call the process of ovulation. There has then developed in the woman a fitting home for a nine-months guest. The endometrium has regenerated and the corpus luteum develops in the ovary. This latter probably should be regarded as a gland of internal secretion. If the ovum becomes fertilized the corpus luteum persists all during pregnancy; if the ovum remains unfertilized, it degenerates and disappears and menstruation occurs again. The same process is repeated with each cycle.

The relationship between ovulation and menstruation, particularly as regards the time between the two processes, has given rise to much speculation and argument. Some investigators have believed that ovulation may occur any time during the menstrual cycle while others maintain there is a definite orderly sequence between the two. When we consider the order in all other manifestations in Nature and when we realize that the menses occur with practical regularity, it would seem strange indeed that two processes which are so intimately related should not bear a definite relation to each other in regard to time. In other words, if menstruation is the result of failure of fertilization, and death of the ovum, it would be inconsistent in Nature to have menstruation follow in three days one month and in nineteen days the next. In more recent years the most common conception is that ovulation occurs some time in the middle of the menstrual cycle.

MORE RECENT CONCEPTION OF FERTILITY
AND STERILITY

Recently Knaus in Austria and Ogino in Japan, working independently, came to the conclusion that if an ovum is unfertilized it lives only a short time. Ogino states the ovum dies

in a few hours. Knaus states that it cannot be impregnated after a few hours as it quickly develops an albuminous membrane which prevents entrance of the spermatozoa. They both agree that if the ovum is not fertilized within a few hours of ovulation menstruation will occur not sooner than twelve days or later than sixteen days and it will follow regularly in thirteen or fourteen days in a high percentage of cases.

Such being the case, the duration of life of the spermatozoa is the next problem for the consideration in determining the fertile period for conception in women. In regard to this question Knaus states that spermatozoa do not preserve their power of fecundation longer than two days; Ogino, not longer than three days (Fig. 1). In rare cases they may maintain their fecundity as long as eight days. Therefore, if ovulation occurs twelve to sixteen days before the next period and spermatozoa keep their power of fecundity not over three days except in the rare exceptional case, the time of fertility in women must be limited to the period between 12 to 19 days before the next menses. From this the following conclusions are reached:

1. The time of conception is usually the week which falls between the twelfth and nineteenth days before the following menses (*i.e.*, five days ovulation period and the three days previous.)

2. Conception is rarely possible between the twentieth and twenty-fourth days before menstruation is expected (except in those unusual cases where spermatozoa remain viable for a longer time).

3. Conception is impossible during the eleven days before the menses are due.

PREVIOUS CONCEPTION OF FERTILITY
AND STERILITY

In some species in the animal world, the period of fertility in the female is definitely recognized and understood. In certain female animals there is a rutting period or period of sexual activity. This is commonly referred to as the period of "heat." Physiologically this is the period during which the animal is ovulating. Consistent

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with the order in Nature elsewhere this is the only period in which the female can be impregnated. In fact it is the only time in which the female will accept the male. Furthermore, at-

the time of ovulation and to this is ascribed the prolific character of the Jewish race. On the other hand, in the German army husbands were granted furloughs twenty days after the begin-

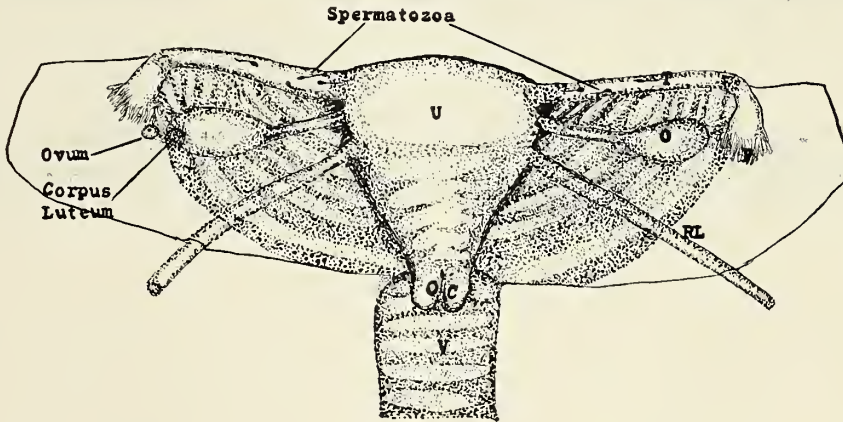


Fig. 1. Schematic sketch of ovum leaving the ovary. Spermatozoa already present in tubes waiting to impregnate the ovum.
Key: U—Uterus; T—Fallopian Tube; O—Ovary; RL—Round Ligament; OC—Cervix; V—Vagina; F—Fimbria.

tempts at artificial insemination at any other time are fruitless.

A common mistake of only a few years ago was the parallel drawn between the rutting or period of "heat" in animals and the menstrual period in women. Nothing is more diametrically opposite. The rutting time in *regula* is the period of ovulation while the *regula* period in women represents the funeral days of an ovum which has failed to become impregnated. Naturally women were advised that just preceding and just following their menses were their most fertile days and that the interval in the middle of the cycle was the relatively sterile period. Is it any wonder, in the light of our present knowledge of the time of ovulation, that failure rewarded our advice as to the sterile period in the menstrual cycle? The repeated failures following the old dictum lead to the widespread belief that at no time in the menstrual cycle is a woman sterile. With this new conception, it is possible that the converse will be true both as to the sterile and fertile periods.

There is already corroborating evidence that the ideas of Knaus and Ogino are correct. It is a religious tenet among the orthodox Jews that a woman is unclean for fourteen days after the beginning of her period and it is unlawful to have sexual relations during this time. The resumption of relations, therefore, occurred just at

ning of their wife's period, or eight to ten days before the next period was due. Only one pregnancy resulted after 400 such furloughs.

THE PRACTICAL SIGNIFICANCE

The practical significance of this newer conception is far reaching. People desiring children can regulate their sexual activities to the fertile period when conception is probable. On the other hand, peoples whose religious beliefs prevent the use of contraceptives can now regulate their sexual activity to the sterile period and abstain during the fertile period. No religious sect teaches that the size of one's family cannot be regulated by abstinence from sexual relations either entirely or during any part of the menstrual cycle. Again people who have no religious scruples against the use of contraceptives but possess a personal aversion to them can determine the time in the cycle when contraceptives are not necessary.

Latz recently in a monograph, *The Rhythm*, based on the work of Knaus and Ogino gave a very lucid presentation of the problem of fertility and sterility in the menstrual cycle. He charted many different types of cycles and indicated just which days a woman was liable to conceive. Although the work is very plain and intelligent to physicians, it is a bit confusing to the average lay person who possesses no back-

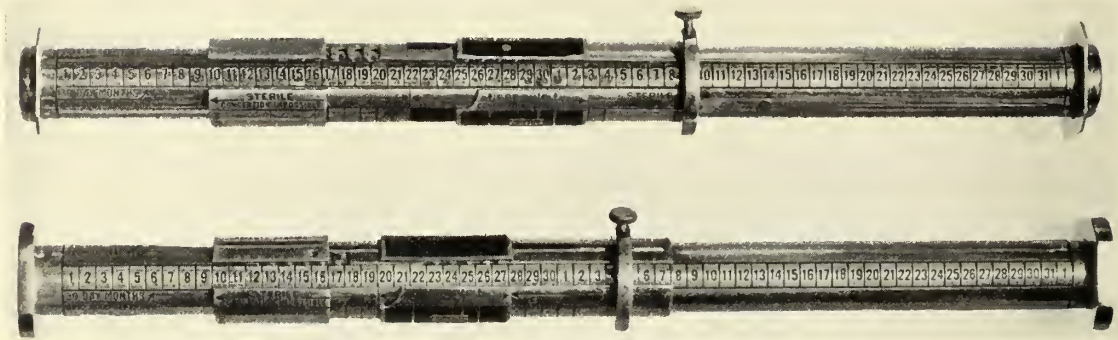


Fig. 2. Two views of the slide rule.

In the upper figure the rule is set for a woman with a thirty day cycle who may be at times as irregular as three days. It is locked at a point on the tenth day of a thirty day month (April, June, September, November) which is the first day of her period.

In the lower figure it is set for a woman who has a twenty-eight day cycle who is perfectly regular. It is also locked at a point on the tenth day of a thirty day month (April, June, September, November) which is the first day of her period.

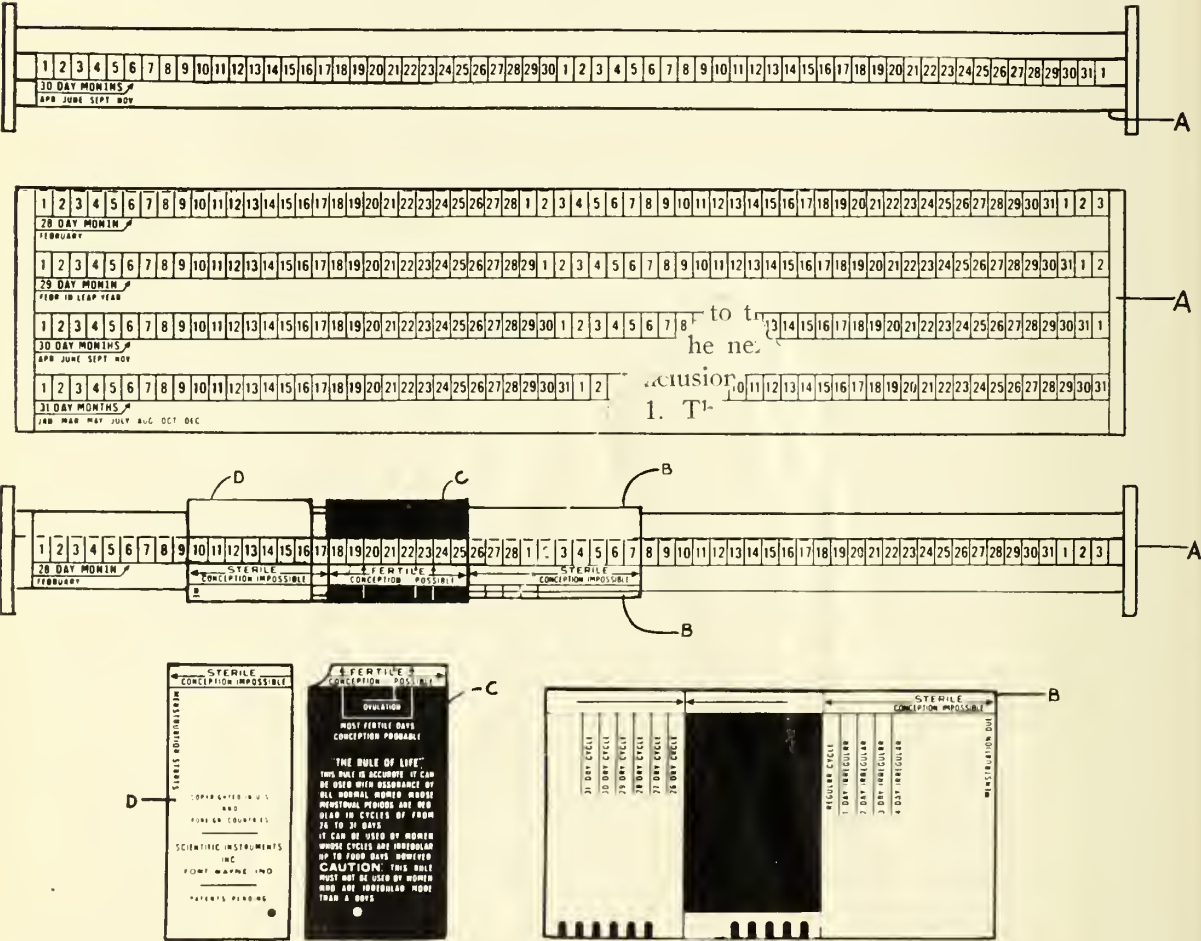


Fig. 3. Prints made from slide rule.
A. Slide rule showing calendars for twenty-eight, twenty-nine, thirty and thirty-one day months.
B. Carriage of slide rule for setting instrument on date in the month desired.
C. Movable sliding portion which is adjustable to fit the five variations in cycles in different women.
D. Movable sliding portion which is adjustable to fit the cycle in women.

ground in the physiological conception of pregnancy.

DESCRIPTION OF A NEW SLIDE RULE

In an attempt to simplify and accurately denote the time of fertility and sterility a slide rule has been developed (Figs. 2 and 3). This rule is a simple guide which can be adjusted to coincide with the menstrual cycle of most women. It tells at a glance the days when conception is probable, possible or impossible. Although, physiologically the time of fertility is limited to four days, on the slide rule this period is placed at eight days in order to make the instrument more dependable. If abstinence is practiced during the period marked "fertile" on the rule pregnancy is impossible in practically all cases. The only exception would be in the case where the spermatozoa remained viable and fecund longer than 3 days. On the other hand, people desiring children can facilitate conception by having relations on the dates marked fertile.

The rule is set to accommodate the peculiarities of the menstrual cycle in each individual woman. For example, it is set at the twenty-eight day mark for a woman with a twenty-eight day cycle, or at the twenty-six or thirty day mark for women with a twenty-six or thirty day cycle. It can only be used by women whose cycles are between twenty-six and thirty-one days. The rule is cylindrical and has etched upon the shaft the calendars of a twenty-eight, twenty-nine, thirty and thirty-one day month. After the instrument is set to coincide with the cycle peculiar to the individual, the carriage of the rule is rotated to the month in question. For example, if the month happens to be May, it is rotated to the thirty-one day month calendar. Then the left edge of the carriage is placed to coincide with the first day of the woman's last period. Then by reading along the margin of the rule, the person can tell immediately just which days she is fertile and which she is sterile. However, some women are not absolutely regular. Their cycle may usually be twenty-eight days but occasionally they may delay two or three days. There is placed on the rule a second sliding portion to meet the needs of women whose cycles are irregular up to four days. By adjusting the second sliding portion as the case demands to the one, two, three or four days

irregular marks, the fertile period is lengthened to accommodate for this irregularity. For example, if a woman usually has a twenty-eight day cycle but occasionally is two days irregular, adjust the left side sliding portion to the twenty-eight day cycle mark, adjust the second right side sliding portion to the two day irregular mark, and then if her period begins today, May 22, move the carriage to the date 22 in the thirty-one day month. Then lock the rule. It is now set for this particular woman for one month and it does not have to be touched until her June period begins.

EXCEPTIONS

This rule of course applies only to women who have cycles from twenty-six to thirty-one days and who are not more than four days irregular. It should not be used by any women whose periods do not fall within these limits. However, it is possible to develop slide rules which will fit their personal peculiarities. Occasionally illness, emotional strain, severe shocks, injuries, or extreme exhaustion may delay the time of ovulation and hence delay menstruation. At such times the rule should not be followed as it may not be reliable. The patient should wait until the cycle of her periods is reestablished. After a pregnancy and lactation, the rule should not be used until her cycle has become regular again.

SUMMARY

1. There is a definite time relation between ovulation and menstruation.
2. The ovum is capable of fertilization only for a few hours.
3. Ovulation occurs twelve to sixteen days before the appearance of the next menstruation; in most cases thirteen to fourteen days.
4. Spermatozoa, except in rare cases, remain fecund not longer than three days.
5. There is, therefore, a fertile and a sterile period in a woman's menstrual period.
6. The period of fertility lies between the twelfth and nineteenth days preceding the next menstrual period.
7. A slide rule has been developed which graphically shows which days are fertile and which days are sterile in normal women.
8. This rule is applicable only to women whose menstrual cycle is between twenty-six and thirty-one days and who are not more than four days irregular.

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THE RÔLE OF THE SOFT TISSUES IN THE DIAGNOSIS AND TREATMENT OF BACK INJURIES*

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THERE is probably no field in industrial surgery in which the results of treatment vary so much as in that bugbear of the insurance company, of the railroad company, and I might say, of that field of general practice in which relief of back pain is sought. I have some hesitation in coming before you to express ideas which I know are in some measure antagonistic to those of the old school and which at first glance may appear to be a return to the empirical methods of my forefathers. Only the other day a colleague stated that my Welsh ancestry was evident in my ideas regarding the treatment of low back strains. For long the profession has been at a loss to explain, or at least, has sat back in smug complacency and refused to recognize the good results which we must admit are frequent,

in the treatment of many of these low back complaints by the manipulative charlatan. I would recommend to all of you a perusal of an article appearing in the January, 1930, number of the *Journal of Bone and Joint Surgery*, on the "Manipulation of Joints," by Clarence H. Heyman, of Cleveland.⁶

The profession must awaken to the fact that there is a place for the consideration of manipulative treatment in joint disabilities. It is my feeling, however, that the necessity for manipulative treatment has arisen in large measure because of our failure to understand the fundamental pathology in traumatic lesions about the joints and particularly those changes occurring in the back. The charlatan treats these cases in ignorance of the pathology and on wrong premises. We need not, and can approach these cases with an intelligent and logical viewpoint.

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Traumatic injuries of the back, excepting those associated with gross demonstrable fractures and dislocations, resolve themselves into periarticular tissue injuries about the joints and lesions of the muscles and fascias intimately associated therewith. Pain is a reflex due to irritative factors, traumatic or infectious. In the case of poor posture, pain is almost invariably a result of muscular strain. In the well balanced type of individual every segment of the back lies well supported upon the next lower segment. At all points the center of gravity is well supported in balance. In that type in which there is an approach to the horizontally placed sacrum causing an increased angulation at the lumbosacral joint, an increase in the lordosis may be a factor in muscle strain and the poorly balanced lumbosacral articulation may produce ligamentous strains. Imagine, if you will, the multitude of painful stimuli which originate at this area and you have the symptoms of backache. But that is not all, a vicious circle is started. The sufferer is constantly tired, has lowered reserve and lessened muscle tone and the underlying pathology is aggravated. Anomalies of the back occur frequently in this region and for the most part are deviations from the normal mode in the development of the transverse articulations of the fifth lumbar and first sacral vertebræ and incomplete development of neural arches. Willis,⁸ of Western Reserve, has pointed out the frequency of these anomalies and Brackett,¹ of Boston, in an article in the *Journal of Bone and Joint Surgery*, read before the joint meeting of the British and American Orthopedic Associations, has stressed the fact that disabilities influenced by such anomalies are for the most part, soft tissue strain. Dr. Myron Henry,⁵ some years ago, and Dr. Meyerding,⁷ have elucidated, I believe, to every member of the profession in the Northwest, that anomaly called spondylolisthesis, in which an actual dislocation of a vertebra takes place at this site. Anterior-posterior and lateral x-ray views should be taken in every case of low back complaint and careful evaluation of the findings should be made; but let me warn you that in viewing an x-ray of this region you must not forget the soft tissue involvement. An investigation of the tensile strength and elasticity of fascia lata sutures shows that its elasticity and tensile strength is directly proportional to its cross-section area.⁴ When one realizes that

the fasciculi surrounding the muscle bundles of the low back region are relatively small and short, one appreciates that undue strain placed upon them readily results in tears of the fascia, usually at the site of its insertion upon the bony structures. The frequent finding of localized areas of tenderness, apparently within the soft tissue, should lead one to suspect the frequency of rupture of small muscle fibers. Traumatic soft tissue lesions result in localized hematomata which are resolved with the formation of scar tissue; and scar tissue within these muscle bundles is necessarily relatively inelastic. Early mobilization, as soon as organization has occurred, is indicated to preserve elasticity.

THE INDUSTRIAL BACK

In presenting this phase of my paper it is necessary, for clarity, to speak briefly of arthritis. From the multitude of types described, two main types are evident, hypertrophic and atrophic, representing bone and joint reactions to infection or toxemia. A consideration of these types is not essential to the present discussion but I wish to briefly point out that these are end-result entities and in the early stages, especially in the spine, are often unrecognizable, so that the occurrence of a painful back in the absence of demonstrable arthritis does not preclude arthritis, especially that type of plastic arthritis commonly ascribed to infectious origin and attacking the transverse articulations. The evidence of a careful history and a general physical examination are more reliable criteria at this early stage. Conversely, the presence of true arthritic changes does not argue against an "industrial back" but perhaps renders the subject more liable, and treatment should be cognizant of the close association of one with the other. If we strip the skin and superficial fascia off the back and with an x-ray eye consider the underlying structures we are amazed at the innumerable short muscle fibres, overlying, intertwining, and criss-crossing from ilium to process, process to spine, here, there and everywhere—literally thousands of them. And further, ligaments of almost equal number, capsules of transverse articulations, fascial expansions, dural prolongations along nerve roots, and then the comparatively simple and sturdy vertebræ under all, and yet most intimately a part of the whole. And nearby the sacroiliac joints, simpler and infinitely sturdier than any of the other joints.

Let me digress for a moment at this point. I believe there is such a thing as sacroiliac subluxation or, at least subluxation somewhere in the lumbosacroiliac region. I do not believe it is as frequent as stated by some.⁷ I recall two positive roentgenograms of rotary subluxation. One case ossified completely and the other was relieved by manipulation. I have several cases relieved by manipulation in which the x-rays were negative but I cannot convince myself that these were subluxations. Rather, I guess that they were snapping ligaments, taut muscle fibers or pinched tissues relieved by manipulation. I recognize the possibility but not the probability. For diagnosis of sacroiliac strain I require the following criteria:

1. Previously negative history for arthritis or subacute infection substantiated by negative findings on general examination.
2. Sudden onset.
3. Excruciating, persistent, localized pain.
4. Pain radiation, if any, down the sciatic nerve. (Not lateral or anterior femoral cutaneous as these arise high in the lumbar plexus.)
5. Relief, at least transient, by manipulation.
6. Recurrence as above.
7. Positive Gænslen sign (Lovett, Goldthwaite and Lærrec signs are misleading.)

But what should impress one most in such a mental dissection is not sturdy bone but rather soft tissue, and this must be considered primarily in the diagnosis and treatment of these conditions. In the absence of positive clinical evidence of arthritis or x-ray evidence of causative anomaly or injury to bone structure, the condition usually resolves itself into one of soft tissue injury. The treatment is that of all periarticular injury. Early rest and support to allow organization to occur and acute pain to subside, followed in a few days, depending on the extent of injury and the patient's athletic development, by the restoration of function. And this I stress, *restoration of function* by heat, massage and exercise. The prolonged splinting of these backs by rest, strapping or braces is detrimental to good results, an economic waste and tends to make confirmed invalids, too often called malingerers though the fault lies with the profession.

These injured backs are susceptible to arthritis, so every possible focus of infection should be searched and treated, especially the bowels and prostate. It is this group which makes up

such a large percentage of back cases in the Veterans' Bureau.

In case the back has continued beyond the acute stage and mobilization is proceeding too slowly, the forceful manipulation of the back in all directions will mobilize it and reproduce the original injury, from which point proper treatment can be instituted. In these cases, especially the old chronic rigid types, I always carefully rule out arthritis. Many of these backs, once injured, are peculiarly susceptible to repeated strains.

CONCLUSION.

The normal function of the spine depends primarily upon balance and secondarily upon the physical development of the supporting soft tissues. The least change in this balance calls for compensation which, if adequate and normal to the component parts, will not cause complaint. Though compensation be adequate, the reserve ability to react normally to strain is frequently lowered by alteration in the balance or physical status of the parts. Treatment should be directed to a restoration of the physical support with particular stress laid upon soft tissue rehabilitation. A careful evaluation of the factors at play in producing the back complaints must be made with the realization that clinically the manifestations are soft tissue lesions, in a few cases aggravated wholly or in part by anomalies or associated arthritis. X-rays are of paramount importance in evaluating these conditions but a keen judgment is necessary lest one attach too much importance to its findings. I believe that the restoration of function in the soft tissue should be attempted as early as possible. Otherwise, supporting belts or braces may be necessary to fix the part and prevent recurrence of symptoms. Surgical intervention in certain types is indicated but I believe that many of our spine fusions in the past have been done because the general profession failed to recognize the soft tissues in their treatment of these conditions and surgery became necessary as a mechanical support.

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GENERAL PARESIS

A BRIEF CONSIDERATION OF ITS RECOGNITION AND TREATMENT

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WITHIN recent years, the prognosis of general paresis in the adult has been favorably influenced. Three factors are chiefly responsible for this: more adequate treatment of early syphilis; greater accuracy in the recognition of pre-paresis and early paresis; and the use of fever therapy. This presentation is made for the purpose of bringing these matters more directly to the attention of those whose work is essentially in other fields than syphilology or neuro-psychiatry.

General paresis (dementia paralytica) is an organic psychosis, chronic in its course.

Previous to the discovery of the spirocheta pallida by Schaudinn, reported with Hoffman in 1905,¹³ many theories were advanced as to the cause of this disease. Mickle,¹⁰ in 1886, listed such causes as sun-stroke, religious excitement, and masturbation. In classifying 4,284 cases diagnosed general paralysis of the insane, 991 were listed as "cause unknown" and only forty-one were indicated as due to "venereal disease." Today, it is universally acknowledged that the spirocheta pallida is the primary etiologic agent in general paresis.

Pathological examinations reveal the organic basis upon which the clinical findings rest. Both grossly and microscopically, the chief changes are noted in the fronto-parietal region. The dura is often tightly adherent to the skull and pachymeningitis hemorrhagica is frequently present. The pia-arachnoid is grayish, thickened and frequently so adherent to the cortex that upon stripping it off, decortication occurs. The convolu-

tions, particularly anteriorly, appear shrunken. In the widened sulci a turbid fluid is noted. Section shows cortical atrophy, dilated ventricles, and occasionally infarcted areas. Microscopically, inflammatory changes are noted in the leptomeninges, plasma cell and lymphocytic infiltration being present. The cortex shows changes in both the vascular and nervous tissues. There are fewer ganglion cells, and those present show various types of degeneration, while the glial tissue is increased. Perivascular infiltration, especially with plasma cells, and new vessel formation, are exhibited. Again these alterations are noted chiefly in the anterior cortical regions, but may be seen less extensively in scattered areas elsewhere in the brain or even the spinal cord.

The onset of symptoms in this disease is from thirty to fifty-five years of age, as a rule about ten to fifteen years after the initial infection. Some cases, however, are reported, in which the chancre preceded the general paresis by a year or even less, and others in which paresis occurred after a delay of more than thirty years. It should be noted, in contradistinction, that so-called cerebrospinal or meningeovascular syphilis, as a rule, makes its appearance some two to five years after lues has been contracted.

It has been emphasized, and rightfully so, that in from 40 to 60 per cent of secondary luetics, and in about 10 per cent of those in the primary stage, there is an invasion of the central nervous system, as indicated by abnormalities in the cerebro-spinal fluid. These changes are usually in the form of pleocytosis (increase of lymphocytes) and a slightly positive globulin reaction, although at times a positive Wassermann or col-

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loldal gold changes are noted. Despite this early nervous involvement, only a moderate percentage of luetics develop late neurosyphilis, and only a portion of these general paralysis. Off hand, this would seem to indicate that paresis is not very common. Such is not the case, for about 12 per cent of all mental patients in institutions are cases of insanity due to syphilis, most of which are instances of general paresis.

Several factors may be active in preventing a greater number of tertiary neuroles from occurring, despite the great incidence of early neuraxis involvement. Even granting the existence of a neurotropic strain of *spirocheta pallida*, the production of immunity reactions must be the chief preventive mechanism. The knowledge that males are affected by paresis⁴ about three times as frequently as females led to investigation of the effect of pregnancy upon the development of neurosyphilis. The work of Moore¹¹ and of Solomon¹⁶ indicates that gestation is an important preventive mechanism in women. Again Mattauschek and Pilcz,⁸ who made an analysis of the case histories of over 4,000 syphilitic Austrian army officers, pointed out that those who during the first year of their syphilis suffered from an acute febrile disease, did not develop late central nervous system syphilis, while almost invariably those who later exhibited neuroles did not have a febrile disease early in the course of their syphilis. The greatest importance of this observation is the suggestion and support it gave to the use of fever therapy as a preventive measure.

Next to immune reactions, adequate treatment, undoubtedly, plays the greatest rôle in reducing the incidence of paresis. The usual treatment in the early stages of syphilis is chemotherapy, chiefly arsenic, bismuth and mercury. More recently fever therapy, in the form of malaria, has been used as a preventive.

Too much emphasis cannot be placed upon the importance of the early recognition of general paresis. It is obvious that once parenchymal degeneration has progressed to any great degree, the opportunities of producing a remission or so-called "cure" are greatly diminished. Ferraro³ found that after malaria treatment there is no distinct parallelism between the clinical findings and pathological changes, yet the guiding principle should always be early recognition. The shorter the duration of active disease, the less the

brain damage, though one case may progress faster than another, and mild symptoms clinically may be associated with severe tissue injury. Reports of large groups of patients treated by various methods show, as a rule, that the sooner treatment is instituted after the appearance of symptoms, the better the results.

The economic and social rewards yielded the patient, and more particularly his family, from early diagnosis, are frequently immeasurable. These considerations, plus the benefit to the family from a health standpoint, are sufficient to demand such recognition.

Many who are not in frequent contact with general paralysis are prone to think of it as seen in its more advanced forms. For this reason, I shall consider, particularly, the means of its identification in its earlier stages.

Because of the frequency of early central nervous system involvement, it is absolutely essential that every patient with syphilis have periodic examinations of the cerebrospinal fluid over a period of at least five years. These check-ups should be made at least once every six months. The apparent segregation of the neuraxis makes this the more obligatory, for a negative blood Wassermann by no means assures a like finding in the spinal fluid. By such routine periodic examinations many cases of asymptomatic neurosyphilis may be found—that is to say patients in whom there are no signs of clinical involvement of the central nervous system, but in whom pathological findings are present in the cerebrospinal fluid. These cases of asymptomatic neuroles may be detected in the secondary or even the primary stage of the disease, as well as in the so-called latent phase between the secondary and the manifest tertiary stages. Moore and Hopkins¹² have reported a thorough study of 123 such cases.

A certain group of these patients will show the paretic formula in the spinal fluid, *i.e.*, increased cell count (usually), positive globulin, positive Wassermann, and the paretic type of colloidal gold curve as typified by 5555432100, as contrasted with the luetic curve as typified by the changes 0123343220. Certain of these individuals will go on to paresis despite therapy, but energetic treatment should be instituted immediately in an attempt to prevent its occurrence. These cases cannot be definitely diagnosed at this stage as paresis, but must be followed closely so

that if signs of general paralysis do occur, they will be recognized immediately.

When the stage of early paresis develops, it is often mistaken for a functional nervous condition, particularly neurasthenia or simple depression. To avoid this pitfall, thorough history taking, careful neuropsychiatric examinations, and serological studies are necessary. The early complaints are often chiefly of a somatic nature; aches and pains about the body, gastric distress, general ill feeling and the like. Possibly some difficulty in concentration will be complained of spontaneously, but seldom does the patient bring out mental changes. The history must make inquiry as to gonorrhea as well as syphilis, for the former often masks the latter. A negative venereal history means nothing, but a positive one is of value. Change in character or personality should be sought, not alone from the patient but also from his family and friends. It is well known that a history of laxness of morals, inattention to business, decrease in efficiency and some failure in judgment is often to be elicited in the early or prodromal stage of paresis. Symptoms such as headache, vertigo, failing vision and unsteadiness on the feet, especially while walking in the dark, are significant.

The neurological examination often reveals pupillary changes—inequality and irregularity, as well as the better known loss of light reflex, with preservation of accommodation reaction—the so-called Argyll-Robertson phenomenon. Tremor of the mouth and tongue and speech disturbance are commonly noted. There is often a partial ironing out of the naso-labial folds, giving the patient the appearance of being younger than his actual age. The knee-jerks may be exaggerated, absent or unequal. The general appearance is that of one below par. The mental changes now may be indicated by less care about the personal appearance, beginning memory defects, difficulty in concentration, and moral laxness, particularly significant if noticeably foreign to the individual's previous behavior.

Great emphasis must be placed upon the serological studies. A positive blood Wassermann is found in almost all cases, and the parietic formula is almost invariably found in the cerebrospinal fluid. The spinal fluid must always be examined whether the blood be positive or negative. The colloidal gold curve aids in differentiating general paresis from cerebral lues of the

meningovascular type, and the other reactions help in determining the activity of the process.

The early stage passes into the second period or the stage of the fully developed disease. We now find an increase in all the above symptoms and findings. The general physical condition is poorer, as is evidenced by muscular weakness and increase in tremors, although body weight may be normal. Parietic seizures occur, which are apoplectiform or epileptiform in character. Occasionally, a true apoplexy occurs in general paralysis. There is difficulty in articulation, syllables are left out, duplicated or transposed; a like condition is noted in the handwriting.

According to the predominating mental symptoms, four types are now described. In the demented type the already present dementia increases. Failure of memory is pronounced, disorientation as to time, person and place occurs, and simple calculation, (*e.g.*, subtracting 7 from 100 serially), is impossible.

The expansive type consists of overactivity and grandiose delusions, superimposed upon the background of dementia described above. In some instances, delusions of persecution are found. These delusions are loosely strung together. This is the so-called classical paresis, the patient claiming to be of extreme wealth, great strength, or some famous current or past person. Insomnia exists.

In the agitated type, the motor hyperactivity is still more marked. These patients are usually incoherent, express quickly changing delusions, are extremely restless and may go on to emaciation and exhaustion. Finally, the depressed type is often mistaken for involutional melancholia. However, in paresis, signs of underlying dementia and physical and serological findings of syphilis are present. Delusions of unworthiness are very common, as are those of a somatic nature—*e.g.*, the bowels have rotted away, certain organs are missing, and the like.

Remissions, either spontaneous, or therapeutically induced, may occur during the first two stages of paresis proper. Serologically, the parietic formula is present, unless altered by treatment.

Except in case of remission or death, the parietic gradually passes into the terminal period. There is a marked down-hill progression physically, the patient becoming emaciated, incontinent, bed-ridden and subject to frequent parietic

seizures. Mentally, profound dementia occurs—all mental powers are in abeyance, the individual leading practically a vegetative existence. Either death gradually ensues, or the patient is mercifully swept away by intercurrent disease.

Immediately upon determining that the patient is potentially or actually a case of general paresis, treatment must be instituted. Methods vary not according to the patient's physical or mental condition, but to the facilities available for his care as well. However, certain general principles of treatment may be outlined. The ideal for which everyone is working is prevention of the development of paresis. This goal may never be attained, but much can be done to approach it. The prevention of this disease (and other forms of tertiary lues) should begin the moment syphilis has been diagnosed. That is to say, intensive therapy must be instituted in the early stages rather than delayed until manifest tertiary phenomena have appeared.

Two major types of treatment for syphilis are available: chemotherapy and fever therapy. The former is often spoken of as specific, and the latter as nonspecific treatment. Arsenic, in the form of arsphenamine, neo-arsphenamine, sulpharsphenamine and tryparsamide; bismuth as its various salts in suspension or in aqueous solution; mercury, chiefly as the salicylate; and combinations of the metals, as bismarsen and silver arsphenamine, constitute the chief agents used in so-called specific treatment. Iodides are also used. Malaria, soduku (rat bite fever), relapsing fever, foreign proteins (chiefly typhoid vaccine), sulfosin and diathermy are the most important agents or non-specific or fever therapy.

The administration of what I consider the most effective forms of therapy will be considered briefly, following which the treatment most suited to given phases of the disease will be indicated.

I feel that neoarsphenamine and bismuth is the most generally useful form of specific therapy, unless general paresis is present, in which case I prefer tryparsamide. In neurosyphilis, we combine spinal drainage with the intravenous medication. A course of treatment of this type would consist of weekly intravenous injection of neo-arsphenamine 0.6 gram, or tryparsamide two to three grams, followed immediately in cases of neurolues by spinal drainage. Bismuth salicylate, grains two, in oil, or a soluble

bismuth salt in equivalent dosage is given intramuscularly twice weekly. Each course should run for eight to twelve weeks, depending upon the tolerance of the individual. Arsenic intoxication must be watched for. In the use of tryparsamide, the eye-grounds must be carefully inspected before treatment is begun, and frequently during the course as well, for a toxic amblyopia may occur. Following each series of injections a rest interval of six to eight weeks should be allowed before a new course is instituted. The number of courses to be given depends upon the response of the individual patient. This response is judged by the clinical condition and the serological findings of the cerebro-spinal fluid, as well as of the blood.

It is said that the favorable effect of fever upon certain psychoses was known to Hippocrates, but it was not until between 1860 and 1870 that a febrile disease was voluntarily produced in psychotic patients for its curative effects.¹ At that time, Dr. Rosenblum, of Odessa, inoculated the organisms of relapsing fever, malaria and typhoid fever into individuals suffering from general paresis. However, general interest was not aroused until in 1917, when Wagner von Jauregg infected a number of paretics with malaria and noted excellent results following such treatment. Since that time, the production of therapeutic fever in neurosyphilis has been introduced by various agents, as follows: by relapsing fever (Plant and Steiner),¹⁴ 1920; by soduku (Solomon, Berk, Theiler and Clay),¹⁷ 1926; by intravenous typhoid vaccine (Kunde, Hall and Gerty),⁷ 1927; by hot baths (Mehrtens and Pouppirt),⁹ 1929; and finally by diathermy (King and Cocke),⁵ 1930. Each of these methods has been used quite extensively by various workers.

Malaria has had by far the greatest use, and at the present is the method of choice in institutions or large cities where malarial blood is available at all times. In the hands of the occasional user, or in places where the plasmodium vivax is not available, typhoid vaccine should be preferred.

The chief contraindications to the use of malaria are severe generalized arteriosclerosis, aortic disease, active pulmonary disease, impaired renal function, and advanced age. The disease is produced by the intravenous injection of three to eight cubic centimeters of blood just

previously drawn from the vein of someone suffering either from "natural" tertian malaria or from induced malaria of as nearly true tertian form as it is possible to obtain. The blood is withdrawn into a syringe containing about four cubic centimeters of a one per cent solution of sodium citrate.

The onset of the chills occurs, as a rule, about four to twelve days after inoculation. Some fever may occur during this period, but not true paroxysms with chills followed by perspiration. Paroxysms should be accompanied by fever of 103 to 106 degrees F., which should remain 103 degrees to 104 degrees for six to ten hours. Chills may not accompany the temperature rise, but perspiration is usually marked. Headache and muscular pains are common, as is general malaise. After a true tertian strain of malaria has been used therapeutically for a time, it may give bizarre reactions, due probably to the absence of the sexual cycle of the parasite.⁶

The blood pressure should be checked daily, both during the chill and in the interval. The hemoglobin should be estimated every second day and it is well to check the blood chemistry twice weekly for renal function. Icterus must be watched for. If the patient's condition warrants it, ten to fourteen paroxysms are allowed to take place. If any of the following occur, the malaria is interrupted regardless of the number of chills: fall of blood-pressure below 100 systolic; severe anemia, failing renal function; persistent cardiac irregularity; jaundice (not to be confused with the icteric tinge seen with moderate anemia); any evidence of shock. There is a mortality of about 12 per cent attributable to the malaria itself,² but if the above warning signs be heeded this danger may be minimized.

In most cases the malaria may be readily checked by giving quinine sulphate by mouth, *e.g.*, ten grains thrice daily for a week, followed by five grains three times daily until the blood is free of parasites. In case of emergency quinine sulphate may be given intravenously. Neosphenamine is also effective against malaria.

The mechanism by which the malaria produces its beneficial effects is not definitely known. Fever and reticulo-endothelial stimulation are said to be responsible for the good results obtained.

The use of typhoid vaccine for producing therapeutic fever is somewhat safer than malaria in that the fever is always under the immediate

control of the physician, and not dependent upon an active disease. The chief contraindications are advanced age and severe cardiovascular disease. The mortality due to the treatment proper is negligible. A course of treatment consists of from fourteen to sixteen intravenous injections of typhoid vaccine, or combined typhoid-paratyphoid vaccine, given every second or third day. Enough is given to produce a fever which rises to 103 degrees or 104 degrees F. or somewhat higher. The amount required varies with the individual and with each treatment. In this state a "triple typhoid vaccine," which contains 2500 million inactive bacilli per cubic centimeter, may be procured from the State Board of Health. It is best to dilute this stock solution with sterile normal saline, so that 200 million bacilli are to be found in each cubic centimeter. The first injection given should be about fifty million—a test dose. As a rule, each succeeding dose must be increased in order to secure the desired fastigium. The amount of increase varies with each patient, but seldom is each increment greater than 100 million. A second course may be given after a rest interval of eight to twelve weeks. Specific therapy may be used concurrently or in the rest interval, if desired. In any case, chemotherapy should follow the non-specific treatment.

The type of therapy to be used in any individual patient is determined chiefly by his condition upon recognition of the disease. Certain generalizations can be made but it cannot be too greatly emphasized that the treatment of each case is an individual problem. In primary or secondary syphilis, chemotherapy is favored. The treatment must be intensive from the outset and should be checked by serological studies, including cerebro-spinal fluid examinations, at the beginning of treatment and at least once every six months, for a minimum of five years. If neither asymptomatic or frank neurosyphilis has developed during this period and the patient is otherwise in satisfactory condition, he may be considered cured.

On the other hand, should the patient, despite intensive treatment, show signs of asymptomatic neurosyphilis, fever therapy must be considered. I feel that in those cases in which the cerebro-spinal fluid presents the parietic formula, fever therapy should be instituted at once, if not physically contraindicated, and this should be fol-

lowed again by chemotherapy. Regular periodic serological examinations, as well as neuropsychiatric studies must be made over a period of at least eight years. In those individuals with asymptomatic neurosyphilis who do not come within the group of paresis sine paresi, further specific treatment may suffice, but even here hyperpyrexial treatment should be instituted if possible. All these cases must be carefully followed for possible development of frank neurosyphilis.

Once general paresis proper becomes manifest, I feel that the best form of treatment is fever therapy, preferably malaria, if the physical condition will at all allow its being instituted. Chemotherapy, particularly tryparsamide, should follow and must be persisted in for at least two years. Periodic serological and neuropsychiatric studies must be made. Clinical improvement precedes serological improvement (which seldom becomes complete) often as long as two or three years.

As I have stated, the prognosis in general paresis, as a whole, has become less grave. The outlook in the individual case, once the condition is recognized, depends greatly upon the handling of the patient. Satisfactory statistics are not available as yet, in as far as I know, which allow of an estimate in terms of percentage of the preventability of the development of paresis by truly intensive treatment of early syphilis. The prognosis in those cases recognized in the stage of paresis sine paresi is good, although persistent treatment is required.

Early paresis responds more favorably than that in which the disease has been in evidence for long periods of time.

Since malaria and the other forms of fever therapy have been used extensively, alone or in conjunction with specific drugs, the number of remissions in frank general paralysis has increased greatly. To be said to be in a state of remission, the patient must possess insight, must be free of mental symptoms, must be able to resume his former place in society, and preferably be capable of self-support. Previously, a small percentage of temporary remissions occurred or were induced, but qualitatively they were far inferior to those secured by the newer methods of treatment, and were of much shorter duration. Results vary with the type of paresis, as well as with the duration of symptoms before therapy is instituted. In the expansive hyperactive type,

better results are obtained than in the other groups. Some workers have reported as high as 75 per cent of remissions in such cases. The response in the demented type is poor.

Wagner Jauregg,¹⁵ in 1924, reporting four hundred cases of paresis treated with malaria, and followed up, records 33 per cent showing complete remissions for two to seven and one-half years, while an additional 14 per cent showed incomplete remissions, with stationary status. This corresponds well with the average experience reported by most workers. It is essential that chemotherapy follow the nonspecific treatment if good results are to be obtained and maintained.

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FARM ACCIDENTS*

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EMERGENCY rural surgery, with its setting in the farm kitchen—a few kerosene lamps at points of advantage—the makeshift operating armamentarium, inconvenient in its crudeness, though many times ingenious, is largely a matter of history. In the early years of practice of many of us, who began our careers in the small rural community, about the only place that was available for rendering the emergency surgery that farm accidents necessitated was in the home. This was attended in a great many instances by unsatisfactory results, when we consider what those end results might have been. Though this type of practice was many times spectacular and made a good story, it did not tend to produce favorable statistics as regards traumatic surgery.

When I first located for practice in a small country town, the usual reaction was to call the doctor out to the home for every surgical emergency. Even more recently, when first located, as we now are, for group practice in a smaller city, which is quite a medical center for a rather extensive decidedly agricultural territory, the practice of calling the doctor out to the patient was very prevalent. But we have noted a change. An enlightened public was quick to appreciate the advantages of hospital treatment with its technical apparatus and trained workers. And "as the mountain will not come to Mohammed, Mohammed will go to the mountain," so the patient and the relatives, fully aware of the advantages to be gained, bring the patient, at times many miles, to the hospital.

Safe and rapid travel by automobile on improved roads has erased space and centralized rural activities. Though many minor accidents of the farm still are and can be effectively taken care of in the home or in the office of the rural practitioner, the major cases will nearly all find their way to the hospital for attention, both for first aid and subsequent care. It is now

quite infrequent that, when we are asked to come out and see an accident case, the family hesitates at all to bring the patient in to the office or hospital for attention. Probably many of you who are practicing in rural communities will take issue with me on this point. But I can say that it is merely a matter of educating your clientele to this better way of handling the situation, and if it has not been accomplished the fault is with you. And with the constantly mounting number of accidents, it behooves us to institute the very best possible treatment, that the number of permanently disabled be kept at a minimum.

It has often been brought up for comparison that during the World War there were 50,000 deaths and about 200,000 injured, while during the same time in peaceful America 126,000 were killed by accidents and the injured ran into the millions. Recently the National Safety Council reported 95,000 deaths and 10,000,000 injured in one year.

In a consideration of traumatic surgery, with which this symposium is concerned, we can divide accidental trauma into three main groups: (1) transportation accidents; (2) industrial accidents; (3) accidents of usual pursuits.

My paper will concern itself with a discussion of one phase of the last group, namely, those accidents associated with farm life. That farming is a relatively hazardous occupation cannot be denied. With the constantly increasing number and types of machines employed in farm work and with the greater number of farm animals, many of blooded stock and immense size, handled by the farmer and his family, this hazard is constantly on the increase. Yet in a search through the records and from a review of our history files, I am impressed with the relative infrequency of distinctly farm accidents as compared with other types of major accidents occurring in a definitely agricultural community. In an effort to obtain some sort of a broad perspective as regards statistical information on this subject, I attempted to enlist the assistance of a national research service in obtaining authentic figures.

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After a number of weeks, however, I received a reply from them stating that a careful search of all available material failed to reveal any literature dealing specifically with farm accidents. I feel flattered, therefore, that this presentation becomes a somewhat pioneer effort.

Practically any type of accident can occur upon the farm, with its ever-increasing mechanical equipment and motorized transportation. For that reason the rural practitioner must be ready to handle the same accidents that occur in industry and in transportation. But in addition he must be prepared to cope with those emergency problems that are peculiar to rural practice.

For the purpose of this presentation I shall limit myself to a discussion of those situations and will present only such cases as fall definitely into one of the two following classes, namely: (1) accidents by farm machinery and equipment; (2) accidents by farm animals.

Let me mention a few general factors that enter into the handling and prognosis of traumatic surgery, before setting forth specific cases. The age of the patient is always an important factor. At the two extremes of life, trauma is always followed by more serious consequences. Industry is seldom concerned with either; transportation accidents involve more frequently the young than the old, while in farm accidents the aged enter more often into the picture. Thus in a consideration of farm emergencies or whenever dealing with an aged patient, remember that the important thing is to treat the person and not the injury. Always use every recognized method for promoting their recovery, even at the expense of a satisfactory surgical result. Remember that a live patient with a disability is better than a fatality with an ideal operative repair. Another factor that is equally important in traumatic surgery, and which calls for the exercise of that judgment which comes with experience, is to employ surgical intervention only at the right time. Shock, hemorrhage and the infection must always have our immediate attention, but proper judgment must be used to determine when and how to intervene for the preservation of best function.

That the question of infection in traumatic surgery has not been mastered is evident. Recent statistics reveal that 33 per cent of all accidents are complicated by infection. This is an indictment against our surgical treatment, for it always prolongs the disability, increases the hazard and jeopardizes the results. The thorough debridement of every accidental wound is imperative. This together with thorough mechanical cleansing with soap and water is to be preferred to too much dependence upon various antiseptics, many of them colorful but inefficient. If there is a question of serious wound infection, put in your sutures, but leave them untied for forty-eight to seventy-two hours. Then if there is no evidence of infection, the sutures may be tied and the wound closed.

It may be said that as a rule injuries produced by farm machinery present more objective or visible evidences of trauma and fewer remote findings, while the

accidents produced by farm animals show the reverse. This is of importance in prognosticating, as you are usually asked to do by the family the moment you present yourself to see the case. Further points to bear in mind in the treatment of farm accidents I shall attempt to present to you in the discussion of the following few selected cases.

Case 1.—A boy, aged twelve, was brought to the hospital in a semiconscious condition by his father, who said that the lad had been driving a team attached to a wagon hauling manure, which the father was spreading. The ground was frozen and when the wagon struck a rough spot, the boy was thrown off the wagon, striking his head on a frozen lump of earth. He was unconscious when picked up, but had partly recovered by the time they reached the hospital. Examination revealed an extensive wound, laying bare, down to the bone, almost the posterior half of the top of the scalp. At the bottom of the wound, over the right posterior parietal area was a depressed fracture of the skull about 6 cm. in diameter. There was no other visible injury. In the operating room only a small amount of ether anesthetic was needed to thoroughly cleanse the wound, swab it with iodine, and close it firmly by suture without drainage. A small puncture wound was made through the scalp over the lowest point of the depressed fracture to prevent the collection of secretion in this pocket, and a pressure dressing was applied to secure firm approximation to the scalp. No attention was paid to the depressed fracture. A few hours after recovery from the anesthetic, the patient was sufficiently aroused to tell us that his left arm felt numb and that he could move it only with difficulty. The following day, however, he was much improved in this regard and in a few days motion and sensation of his arm were normal. The scalp wound healed nicely with very little drainage and no infection. About four weeks after the accident we performed the secondary operation. A new incision was made and the scalp elevated over the depressed fracture. A trephine opening was made at the edge of the depression and the depressed bone removed in several large pieces with a cranial rongeur. The dura showed no signs of laceration or adhesions and came up very nicely as soon as the bone was all removed. Likewise there was no evidence of splintering of the inner table. For these reasons the dura was not opened. The bony fragments were replaced over the dura in the defect and the periosteum and scalp closed firmly by suture. The wound healed nicely with a firm bony repair, and complete recovery of the patient.

I present this case to show skull injury, both to the soft parts and calvarium. Primary attention to correction of the skull fracture would have meant great risk of infection to brain and meninges. Besides, skull fracture seldom constitutes emergency surgery, except in one instance, and that is if accompanied by hemorrhage of the middle meningeal artery. When this condition is present it must have immediate surgical attention. Spinal puncture is seldom indicated for diagnosis in skull injury, for unless very carefully done with a small needle it will be followed by more harm than benefit. If our primary wound had become infected, it would have been necessary to wait four to six months after healing before proceeding with the secondary operation upon the skull. This is because of the residual infection which remains in the scar tissue, long after healing seems complete. This wait is especially necessary when bony tissues are involved in the secondary operation.

There is one remote effect of skull injuries that must be kept in mind. Fracture through the frontal or sphenoidal sinus gives direct contact with the brain and not the spinal fluid. The immediate reaction is localized and may be slight and of short duration. Weeks or months later the patient has a severe frontal or sphenoidal sinusitis, develops a localized meningitis or brain abscess and may die. This is due to the fact that the mucous membrane lining the sinus is easily stripped from the bone and may not suffer the same tear that the fracture presents. As a consequence it becomes interposed between the edges of the linear fracture and heals as a wick of mucous membrane against the meninges. Subsequent infec-

tion of the sinus with involvement of the lining membrane offers direct extension to the brain. This cannot occur in the instance of fracture through the cribriform plate as there the mucous membrane is firmly adherent and cannot be detached. When healing takes place, if there is not an immediate fatal outcome, bony union results and no subsequent trouble occurs.

Case 2.—An adult male came into the office with the following history: While leaning over the edge of a hay rack on which he was standing to reach for a pitchfork that was stuck into a small cock of hay, he lost his balance and fell outwards so that the handle of the fork came against the right lower portion of his abdomen. He had become nauseated, complained of feeling faint and had severe pain at the site of injury. Examination revealed some subcutaneous hemorrhage over the lower right abdomen and a definite splitting of the superficial fascia with some protrusion of a hernial mass on exertion. He was confined to the hospital for two days, with ice bags to the area of the injury, and was then permitted to go home. As soon as the local tenderness had sufficiently disappeared, he was fitted with a webbing truss having a pad over the site of the hernia. This truss he wore for four months, when there was complete recovery and no further attention necessary. He had been advised to have an operation for the repair of the defect, but we did not feel that operative intervention in this type of injury was necessary. The tearing of the muscle and fascia is nearly always in the direction of the fibers, which heals well due to the approximating action in the line of tension. The occasional aspiration or evacuation of a hematoma is at times necessary.

Encounter with the other end of the pitchfork presents as a rule only the problem of a puncture wound, usually sustained in the hands or feet. The stab puncture wound produced by the tine, since it usually closes promptly, forms an excellent type of wound for the inoculation and growth of the anaerobic organisms, such as the *Bacillus tetani* and the *Bacillus perfringens* of Welch. The possibility of such infection must always be borne in mind, and will be mentioned further in the next case.

Case 3.—A man, aged sixty-three, was brought to the hospital on September 17 with the following history: Earlier in the same day he had gotten out in front of the binder to adjust the reel and came therefore in front of the sickle facing forward. For some reason the horses became frightened and started ahead, with the result that he received cuts on the backs of both legs in the lower third, severing everything down to the tibia on both sides and also fracturing both fibulae into several pieces. He had been attended by his local physician who had sutured the wounds with a few plain catgut sutures. I asked the patient if the doctor had injected any medicine into his thigh, and he answered that this had been done.

I have already referred to tetanus infection. I must strongly urge that in every farm accident, where there is a break in the continuity of the skin or mucous membrane so that such a wound comes into contact with farm equipment or animals or earth, such a case must be given a prophylactic injection of tetanus antitoxin when first seen. For that reason I questioned about it in this case, but judging from developments, the hypodermic given must have been an opiate.

On admission and during the first week in the hospital the temperature range was between 99 and 101 degrees. Later it went as high as 104. About the third and fourth day the catgut sutures sloughed and the wound opened. The eighth day the patient complained of sore throat and said "he thought a cold was coming on." This I interpreted as the onset of tetanus and we promptly gave him 10,000 units of antitoxin intravenously. The following day he had stiffness of his jaw, and he was given 10,000 units of antitoxin intraspinally. This was followed by further doses intraspinally and intravenously for a total of 45,000 units in a period of eight days. This controlled the disease and brought him through to an ultimate recovery. In addition the wound was opened widely, and small tubes inserted into the depths of the wound, and wet hychlorite dressings employed, varied at times by irrigations with hydrogen dioxide solution.

The important factors in the control of tetanus are:

1. The prompt administration of prophylactic antitoxin when the case is first seen.

2. Early recognition of suspicious symptoms for diagnosis, even before neurological findings are manifest. There is no set time for tetanus to appear, as it may be after two days, or as late as thirty or forty days following accidental inoculation.

3. After the onset of symptoms, prompt administration of large doses of antitoxin, 10,000 to 20,000 units, depending upon the severity of the infection, to be followed by further dosage as the progress of the disease indicates.

4. Prompt opening of the wound by releasing sutures to permit aeration. After healing by granulation, secondary operation should not be undertaken for several months. It should then be preceded by prophylactic administration of antitoxin and the weekly intramuscular injection during the period of healing of 1,000 units of the serum.

5. The control of nervous system manifestations. This is accomplished by avoiding all mental and physical stimulation. The use of various sedatives, especially the newer and more active barbiturates. Likewise the use of avertin has proven of value.

Since there is naturally a large amount of the toxin in the blood stream before it affects the nerves, we employ both the intravenous and intraspinal route of administration. Intramuscular injection is too slow for emergency treatment as complete absorption requires twelve to twenty-four hours.

Case 4.—A male, aged forty-six, had been kicked by a horse on the chin three days before coming to us. There was deformity of the lower jaw but no laceration of the skin. He had been given attention by his local physician, but felt that the result would not be satisfactory.

An x-ray examination revealed a double fracture of the mandible, with complete oblique separation at the outer anterior angle on each side. Though the condition of the teeth, many of which were missing, and others loose, made the case really unfit for wiring, nevertheless this was attempted. After a couple of days it was evident that this would not be satisfactory. Lack of opposing teeth also permitted the fracture to get out of place vertically. Therefore, under local anesthesia short incisions were made back of the margin of the jaw under each fracture. Through these incisions silver wire loops were placed in the inferior edge of the mandible to hold the fracture together, avoiding communication with the oral cavity. To keep the lower and upper jaw approximated I devised a support which consisted of a head harness made from straps of webbing. A pair of buckles were fastened as far forward as possible, one on each side. The two back buckles were dropped down on straps so as to come below the ears and were connected by a strap across the nape of the neck. A large enough piece of thin inner automobile tube was obtained and a piece cut out having an oval body with an opening for the chin and four tails that fastened to the buckles. The front pair of tails were cut so as to exert an upward pull and the two back tails so as to give a backward pull. The elasticity of this latter piece made it possible to have it conform to the face and act as a splint against the lower and upper jaw and to exert a constant approximating pull without being too uncomfortable or tight. Non-elastic bandages soon become stretched, loose and useless for the purpose. After the head harness had been prepared and applied, and with the silver wire loops in place we had no further trouble in obtaining an excellent result. As soon as sufficient callous had formed to fix the fragments, the wire loops were removed and the wounds healed promptly.

Case 5.—A farm boy, aged thirteen, was brought to our clinic with the history that the same day, while riding a horse, he had fallen off and struck his right shoulder against the ground. Examination revealed that he was unable to handle his right arm and that he complained of pain in the right shoulder on motion. There was deformity present with displacement of the arm inwards. An x-ray examination revealed a fracture of the neck of the right humerus, with the proximal end of the distal fragment displaced anteriorly and mesially under the pectoralis muscle. Under anesthesia, reduction was attempted and the arm put up in an aeroplane splint under traction. Several x-rays were taken and we made numerous adjustments of our dressings in an attempt to obtain the desired result. At the end of ten days the patient was sent home to report in a week. The position we had was not as good as we would have liked,

since there was over-riding of the fragments, but we felt that it would give a satisfactory functional result. Furthermore, we did not seem to be able to obtain a better position without open intervention, which we preferred to avoid in a young subject.

When the boy returned for observation in about ten days, we found on making an x-ray examination that the position of our fragments was much worse and definitely unsatisfactory. While there was good callous formation from the distal end of the proximal fragment, there was none at all from the proximal end of the distal fragment. For that reason a diagnosis of interposed soft parts was made, and open reduction advised. This was promptly done under general anesthesia. Soft parts were found covering the end of the distal fragment as suspected and there was some difficulty in obtaining just the position we desired. This was finally accomplished, and two bone pegs, which we made from beef bone, were inserted through the end of the shaft, at an angle, into the head of the humerus. A strand of kangaroo tendon was employed for additional fixation. The wound was closed and healed nicely, with the arm fixed to the side of the patient, so as to have as little movement as possible. An x-ray taken two months after the operation showed the fragments in excellent position, good callous formation, and beginning absorption of the bone pegs.

Case 6.—A male patient, aged twenty-eight, was brought to the hospital by ambulance. Three days previously he had been attacked by a bull, and butted about a good deal. He had saved himself somewhat by hanging onto the ring in the bull's nose, and had been finally shoved into a straw stack and left there. Aside from general body bruises, he had much pain in his right chest and complained of difficulty in breathing. His temperature was 102 F., with a pulse of 120 and respirations 26. There

were ecchymoses over his right chest wall and a definite subcutaneous emphysema along the right costal margin, laterally. X-ray examination revealed a traumatic pneumothorax on the right side. This had apparently been more extensive at first and was in the stage of restoration when we saw him, since the mediastinum was displaced slightly to the right and there was compensatory emphysema on the left side. He was treated with ice bags to the chest wall and adhesive strapping, with sedatives administered to control cough and pain. After five days his temperature was normal and he was discharged from the hospital on the twelfth day. X-ray taken a couple of days before leaving the hospital showed further absorption of the pneumothorax, but some fluid in the right pleural cavity. This was not disturbed and another x-ray taken at the Clinic two weeks after discharge from the hospital showed normal restoration of the right chest. In this type of injury, symptomatic treatment is the procedure to pursue, with drastic intervention only when absolutely necessary.

In conclusion, I wish to emphasize these few points:

1. Farm accidents are relatively infrequent in the field of traumatic surgery, considering the large rural population.
2. Rural traumatic surgery merits the same hospital facilities as city.
3. Prolonged or permanent disability is in the majority of cases an indictment of the methods of surgical treatment.

AUTOMOBILE ACCIDENTS*

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THAT automobile accidents are of importance cannot be denied. Approximately 33,500 persons were killed in motor vehicle accidents in the United States during the year 1931, as against 32,939 in 1930; 23,430 in 1926, and 13,939 in 1921. The figures for 1932 are not as yet available. The Metropolitan Life Insurance Company reports that one-third of all accidental deaths among nineteen million industrial policy holders were due to this cause. It is the only type of accidental death which is now increasing in this country. In 1930 among the insured it caused as many deaths as the four principal epidemic diseases of childhood, namely: measles, scarlet-fever, whooping-cough and diphtheria, combined. In that year there was one automobile fatality to every four deaths from cancer, to every three from apoplexy and to every seven and one-half from heart disease, the leading cause of death. More than 2 per cent of all deaths from all causes are now due to automobile accidents. The increase in rate has been among those over the age of fifteen. There has been since 1929 a distinct drop in the death rate in children under fifteen.

The heavy increase in mortality has existed in collision between two automobiles. The present crime situation is deserving of, and has received, the most widespread attention. Protection of the public from criminals is certainly a task of major importance. And yet, in terms of lives lost, the motor vehicle accident problem far overshadows the crime problem. Figures for the latest available year, 1929, indicate that more than three times as many persons are killed by motor vehicles as meet death at the hands of criminals.³

The subject, accordingly, today is timely but inasmuch as there is no injury of which I am cognizant which occurs as the result of motor vehicle accidents which is not duplicated by some other form of trauma, I shall consider the subject purely from a statistical viewpoint. Much in the way of data has accumulated. I have already given you figures taken from the last report of the National Safety Council and statistical material gleaned from the Metropolitan Life Insurance Company reports. As physicians, it does not immediately concern us as to the cause of such accidents, but the results of such accidents certainly do and should concern us. The immediate cause of death of an individual involved in an automobile accident is often diffi-

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cult to determine and for that reason no statistical data as to the cause of death have, as far as I have been able to find, ever been published. This is true also because of the multiple injuries often sustained. The closest approximation, however, to the accumulation of such data is in an article published in the *Archives of Surgery* in March, 1929, by Bacon and LeCount of Chicago, giving the postmortem findings in 383 consecutive cases of individuals killed by motor vehicles. The ages of these individuals ranged from four to eighty-eight. Of course, in many of these individuals multiple injuries were found. However, just to give a brief outline of the injuries, we might cite the following data: In 223 of these cases the skull was fractured; over 58 per cent had fractures of the cranial and facial bones; 44 per cent plus—fractures of the ribs; over 27 per cent—fractures of an extremity; 15 per cent plus—fractures and dislocations of the spine; and over 10 per cent—fractures of the pelvic bones. In only twenty-three cases in this series were there no bones broken. In 34 per cent of the fractured rib cases there were lung lacerations. The heart was found ruptured in six cases. There were numerous cases of extensive tear of a large blood vessel. The diaphragm was ruptured in twelve cases; the liver in fifty-three; the spleen in twenty-five. There were no cases of lacerations of the pancreas but in four cases contusion of the pancreas were found. A kidney was found bruised or torn in twenty-five instances. Strangely enough most of these were on the right side.

I have been unable to find any literature or statistical data relative to the injuries sustained in non-fatal automobile accidents, and, accordingly, thought that it might be of interest to give briefly the results of an analysis of 1,000 consecutive cases, the records of which are in my office. I apologize for not including a larger series in this paper but the analytical work on these alone proved rather large and I am inclined to believe that the resulting figures in a possible 5,000 cases would not differ materially from those in this 1,000. The cases include not only individuals cared for but individuals examined from a medico-legal viewpoint. The injuries or symptoms cited were frequently not evident at the time of examination but if claimed by the patient were included.

The cases in this series run from under a year to the age of eighty, over 55 per cent occurring in the second, third and fourth decade and by far the largest group centering around the age of twenty. The sexes are about equally divided. Passengers, however, were injured more than twice as frequently as drivers. Of the total, over one-fourth were pedestrians. Contrary, I believe, to the usual opinion (though I have seen no statistics on this point), over twice as many accidents occurred during the daytime as at night. It was exceptional to encounter an individual with but a single injury. Few escaped, among other injuries, contusions and abrasions. Thus approximately three-fourths of the number gave histories of, or showed signs of, contusions and abrasions. Over 15 per cent of the entire group received lacerations of the face, many of them disfiguring, and almost 5 per cent of the individuals had

broken, loosened or missing teeth. The majority of the lacerations were caused by glass, and over 20 per cent of the individuals had lacerations other than on the face. Sprains and strains were exceedingly common, occurring in over two-thirds of the cases. Although but ninety-six in the group gave a definite history of unconsciousness, which included 19 skull fractures, 178 individuals complained of headaches. Many of these individuals gave no history whatsoever of any blow of any sort on any portion of the head or face. Nervousness was a symptom commonly complained of, particularly among the women, and many of these complaining of nervousness also complained, without head injury, of headaches. Among the ninety-six patients giving a history of unconsciousness there were but thirty-six that gave a true history of concussion. On close questioning it was found that many of these individuals who gave a history of unconsciousness had merely fainted. Although there were, as just stated, but thirty-six frank cases of concussion and nineteen proven cases of skull fracture, nevertheless seventy-nine complained of vomiting and 70 of nausea. In some, however, vomiting was associated with other injuries, such as intra-abdominal injury and abdominal wall contusion and were not associated with head injuries. Forty-nine women complained of marked upset in the regularity of their menstrual periods and there were seven cases of miscarriages attributable to the accident. There were seventeen cases of frank hysteria, practically all of them in women, and practically all of them passengers. The majority of these had no physical injury whatever or only relatively slight physical injury. Seven individuals attributed the development of an inguinal hernia to the accident which they had sustained.

Almost every imaginable symptom and development of symptoms was attributed, particularly in the cases having legal aspects, to the automobile accident which the patient sustained. Among these might be noted diarrhea, pneumonia, fainting spells, wrist ganglion, cough, bladder and bowel disturbance, loss of hair, vaginal discharge, loss of breath, heart disease, nephritis and frequent urination. There were but two cases of proven ruptured kidney and but two dislocations in the entire group. There were a number of definite nerve injuries, most of them associated with fractures, particularly of the humerus and the head and neck of the fibula. In going over these cases I was surprised at the relatively small total number of fractures encountered. Two hundred fifty-six fractures occurred. Inasmuch as certain individuals received more than one fracture, the total number of individuals sustaining fractures is considerably less than this figure. Many more passengers and pedestrians suffered fractures than did drivers. The fractures were divided as follows: Skull 19, face 19, vertebrae 10, pelvis 10, coccyx 3, clavicle 17, scapulae 3, fingers 3, Colles fracture 2, humerus 10, radius 7, ulna 12, olecranon 2, metatarsals 2, tarsals 1, patella 2, femur 11, tibia 26, fibula 25, metacarpals 5, carpals 1, ribs 55, sternum 1. These figures tally closely with those given by Ramsey⁴ of London, Ontario, who without giving any statistics states that the adult injured in an automobile accident, if injured in the lower ex-

tremity, usually receives a comminuted fracture of the tibia.

This report, gentlemen, has been brief and purely statistical, and based, I fear, on an insufficient number of cases to allow us to come to any definite conclusion. However, in view of the lack of literature on this subject it seemed to me that the figures given might be of interest. Later, with more time at my disposal, I hope to be able to analyze a very much larger series of cases so that we may be able to know, as physicians, approximately what we are apt to encounter when called to care for an automobile accident and what might happen to us as individuals if we ourselves should be involved.

I cannot refrain from expressing the distinct impression gained from an analysis of this 1,000 cases, that the more trivial the physical injuries the greater are

the patients' complaints and the more chance there seems to be of litigation.

In closing, may I make a plea. The medical profession throughout its history has unselfishly contributed to the decrease in mortality and morbidity of the human race, accomplishing this not only through research of brilliant minds but also by education of the public. Is there not something that we, as physicians and citizens of these United States—156,440 strong—can do by united influence to decrease these accidents and thus lessen our general death rate, prevent untold suffering and make this a safer country in which to live? Think it over.

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INDUSTRIAL ACCIDENTS*

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SINCE the enactment of the Workmen's Compensation Law the medical profession has been expected not only to treat Industrial Casualties but to give advice on the various medico-legal points that develop in relation to claims arising therefrom.

Many surgeons have concentrated their attention on the immediate care and treatment of these cases and often have lost sight of the fact that it is also important to keep accurate records and to render reports of the injuries and their subsequent progress, and have failed to familiarize themselves with the Industrial Laws governing these cases, as well as the methods used in evaluating end results in those cases that show some permanent disability. There are still many in the profession who have not had the opportunity or the necessary experience in handling these cases to intelligently advise in their solution.

There are various definitions given of what constitutes an accident in different states, and it may be well at this time to quote from the Minnesota Statutes their definition of an accident:

"An accident means an unexpected or unforeseen event happening suddenly and violently with or without human fault and producing at the time injury to the physical structure of the body." (4 Minn. Workmen's Compensation Decisions, 1926-1927.)

An industrial accident means a personal injury by accident arising out of and in the course of employment. All cases here reported are subject to the Industrial Laws. Evaluation of end results must be ap-

proved by the Industrial Commission before final settlement can be made.

The various degrees of disability are classified as follows: Temporary Partial; Temporary Total; Permanent Partial; and Permanent Total Disability.

"Temporary partial disability means that an employe has received an injury but is able to do part of his usual work, and this disability continues until he has completely recovered.

"Temporary total disability means that as a result of an accident an employe is totally disabled from work and when his recovery is complete he is physically the same as he was before the accident.

"Permanent partial disability means that an employe has some permanent loss of function to the physical structure of his body as the result of accident.

"Permanent total disability means that as a result of an accident an employe is so permanently injured that he will never be able to pursue any gainful occupation again."

As there appears to be some confusion about compensation awards it may be well to read some of the regulations set forth by the Compensation Laws of the State of Minnesota governing them:

"The schedule of compensation provides for injuries producing temporary total disability sixty-six and two-thirds per centum (66⅔%) of the daily wage at the time of injury subject to a maximum compensation of twenty dollars (\$20.00) per week."

"In all cases of temporary partial disability compensation shall be sixty-six and two-thirds per centum (66⅔%) of the difference between the daily wage of the workman at the time of injury and the wage he is able to earn in his partially disabled condition. This compensation shall be paid during the period of such disability, not however, beyond three hundred weeks."

"In all cases of permanent partial disability it shall be considered that the permanent loss of use of a member shall be equivalent to and draw the same compensation as the loss of that member, but the compensation in and by said schedule

*Read in Symposium on Emergency Surgery before the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 24, 1933.

provided shall be in lieu of all other compensation in such cases."

"In cases of permanent partial disability due to injury to a member resulting in less than total loss of such member not otherwise compensated in this schedule, compensation shall be paid at the prescribed rate during that part of time specified in the schedule for total loss of the respective member which the extent of injury to the member bears to its total loss."

"In addition to the compensation provided in the foregoing schedule for loss or loss of use of a member, compensation, during the period of re-training for a new occupation as certified by the Division of Re-Education, shall be sixty-six and two-thirds per centum (66⅔%) of the daily wage at the time of injury not exceeding twenty-five weeks (25), providing the injury is such as to entitle the workman to compensation for at least seventy-five weeks (75) in the schedule of indemnities for permanent impairments, and provided the Industrial Commission on application thereto shall find such re-training is necessary and make an order for such compensation."

TOTAL NUMBER OF CASES

Abrasions	44
Amputations	18
Burns	84
Contusions	254
Crushing injuries	18
Dislocations	9
Foreign bodies	104
Fractures	227
Hernias	28
Lacerations	519
Puncture wounds	157
Sliver wounds	89
Sprains and strains.....	443
Miscellaneous	6
Total	2,000
Male	1,806
Female	194

This report is presented to show the various injuries, their location, frequency of occurrence, the average age at which they occur, average time lost and end results in two thousand cases of industrial casualties. The time allowed for this report will not permit of any extensive discussion of treatment, or types of instruments used in estimating disability. The various injuries are classified as follows, and for convenience they have been divided into six groups:

GROUP I—ABRASIONS

Location	Number	Av. Age	Av. Days Lost
Upper extremities.....	30	33	3
Lower extremities.....	14	41	8
—	44		

CONTUSIONS

Hand and forearm.....	80	32	0
Arm and shoulder.....	10	38	0
Foot and leg.....	75	35	0
Knee	25	34	11
Head and neck.....	15	36	0
Chest	19	33	6
Abdomen	2	44	1.5
Thighs (inguinal region).....	13	37	8
Back	4	26	0
Multiple contusions.....	11	50	25
254			

BURNS

Head and neck.....	16	34	5
Hand and wrist.....	38	29	9
Forearm	11	32	10
Arm and shoulder.....	3	33	4
Thigh	1	59	3
Foot	15	31	7
—	84		

Group I—In Group I are the abrasions, contusions and burns, and they comprise nearly one-fifth of the entire number of injuries. The greatest number of injuries shown in this table are the contusions. The next in number are the burns—the majority of which were of the second degree. The ambrine wax method was used in the treatment of most of them with the most gratifying results, as well as comfort to the patient. We found it gave rapid relief from pain, and convalescence was shorter than in other forms of treatment, and very few of those of greater degree showed scar formation. In the secretory state of burns characterized by exudation of serum, the affected surfaces were painted daily with a mild aqueous solution of mercurochrome. During the subsiding period the periphery of the burned area was treated with scarlet red to stimulate the growth of skin. The tannic acid method was also used in some of these cases, but was found more difficult to handle in those patients who were ambulatory. The abrasions were the smallest in number shown on this table. Twenty-three per cent of them were infected and these individuals were the only ones that lost time.

GROUP II—PUNCTURE WOUNDS

Location	Number	Av. Age	Av. Days Lost
Face	2	38	2
Neck	1	55	3
Breast	1	27	0
Buttocks	2	36	0
Fingers, hand, wrist.....	74	33	4
Thighs	3	25	0
Knee	3	33	4
Foot and ankle.....	71	29	4
—	157		

FOREIGN BODIES

Eye and Eyelid.....	95	30	0
Ear	1	25	0
Forearm	1	36	49
Elbow	1	49	10
Fingers and hand.....	6	36	7
—	104		

SLIVERS

Fingers, hand, wrist.....	86	29	4
Head and neck.....	1	45	0
Thigh	2	21	4
—	89		

Group II—In Group II are the puncture wounds, foreign bodies and slivers and they comprise less than one-fifth of the entire number of injuries. The greatest number of injuries shown in this table are the puncture wounds, one case having permanent loss of function in the hand. The next in number are the foreign

bodies, and with the exception of those about the eye are usually caused by steel, which is easily located and removed with the assistance of the fluoroscope. Foreign bodies in the form of slivers have been grouped separately because they are usually the result of wood fibre which cannot be seen under the fluoroscope, and the smaller sliver cases usually come in for treatment after some fellow worker has attempted to remove them, and are usually infected. A funicular opening is made in puncture wounds located on the palmar side of the hands or fingers and plantar aspect of the foot. This opening is carried through the skin into the fascia and is inspected for debris or contaminating matter before being treated. Antitetanic serum is used routinely in these types of injuries. "Infection is the greatest contributor in the time lost factor, as well as the cause of permanent disability."

in the sacro-iliac group is usually caused by an accompanying neuritis. The persistence of severe symptoms in the sacro-iliac group undoubtedly is due to the difficulty of maintaining immobilization as well as complexity of the structures involved, and in some cases an honest effort is not made to return to work. Fifty per cent of the knee cases were complicated either by a bursitis or synovitis. Disability was prolonged in one case of leg sprain due to tearing of the plantaris muscle. Twenty-five per cent of the shoulder sprains were protracted due to bursitis. Four cases in the entire group showed some permanent disability. Two were of the knee with an average permanent loss of 10 per cent, and two of the shoulders with an average permanent loss of 13 per cent.

All the hernias in this table were of the indirect type and they were equally divided between right and left. Compromise settlements are usually made in hernia cases since the Supreme Court in this state has held that an aggravation of a pre-existing hernia is compensable, as well as a recent hernia following trauma.

GROUP III—STRAINS AND SPRAINS

Location	Number	Av. Age	Av. Days Lost
Neck	5	29	10
Shoulders—strain	34	36	15
Shoulders—sprain	22	34	43
Elbow	16	36	22
Wrist	22	30	21
Forearm	8	34	15
Fingers, hand.....	16	31	1
Chest	29	38	6
Abdomen	6	26	3
Inguinal region.....	14	31	2.5
Back	14	23	6
Lumbosacral strain.....	137	35	14
Sacroiliac strain.....	23	34	77
Hip	3	47	50
Thigh	3	37	1
Knee strain.....	13	33	15
Knee sprain.....	21	35	45
Leg	4	45	35
Ankle strain.....	22	32	4
Ankle sprain.....	25	34	12
Foot	6	45	21
	443		

HERNIAS

Location	Number	Av. Age	Av. Weeks Lost
Right inguinal.....	14	35	6
Left inguinal	14	35	6
	28		

Group III.—In Group III are the strains and sprains and hernias and they comprise nearly one-fourth of the entire group of injuries. In the table of strains and sprains the greatest number were in the lumbosacral, ankle and shoulder regions. All the cases seen in this group come from a class of men employed in heavy manual labor. There is no light work to which to return these men after they have improved, and they must be treated and kept under observation until they are able to return to their usual occupations. Therefore, it will be seen that the average time lost in this type of injuries is greater than that lost in other occupations. The cases that show the greatest time lost in this group are the sprains of the knee, sacro-iliac region, the leg and shoulder. Protraction of disability

GROUP IV—LACERATIONS

Location	Number	Av. Age	Av. Days Lost
Head and neck.....	63	35	1
Shoulder	1	32	7
Forearm	16	37	7
Fingers, band, wrist.....	397	31	5
Hip	3	33	7
Buttocks	1	31	42
Leg	11	29	10
Knee	4	32	1
Ankle	4	42	63
Foot	19	29	11
	519		

DISLOCATIONS

Sesamoid	1	0
Inner end of clavicle.....	1	112
(fractured skull)		
Mid-phalanx middle finger.....	1	21
(sprain of extensor tendon)		
Foot (bi-malleolar fracture).....	2	84
Lunate (fracture of ulna).....	1	84
Left index.....	1	0
Wrist	1	0
Lunate	1	70
	9	

AMPUTATIONS

Fingers	15	32	65
Hands (both).....	1	27	356
Toes	2	30	84
	18		

Group IV.—In Group IV are the lacerations, dislocations and amputations, comprising about 27 per cent of the entire number of injuries. The greatest number in this table are the lacerations, principally of the fingers, hand and wrist. Of this number twenty showed evidences of profound infection with tendon sheath involvement. Six suffered some permanent disability of either the thumb or fingers, as follows:

	Per cent
Right thumb.....	10
Right thumb.....	15
Ring finger.....	25
Index finger.....	12
Index finger.....	35
Middle finger.....	25

Two cases of injury about the ankle joint involved the tendo-Achilles and one involved the subastragaloid joint as well, with a disability of fourteen weeks and a subsequent 40 per cent permanent loss of function in the foot. Twenty-nine cases in this group have lost as a result of infection alone an average of five weeks. The average age in cases suffering permanent disability in this group was thirty-nine years.

All the amputations in this group were located in the upper extremities. In one case involving both hands, the first metacarpal and proximal carpal bones were saved on one hand, and this man has been rehabilitated and is now earning three times the salary he was receiving at the time of his injury.

GROUP V—FRACTURES

Location	Number	Av. Age	Av. Weeks		Perm.
			Lost		
Skull	3	40	20		1
Nose	1	32	1.5		0
Lower jaw.....	1	45	12		0
Clavicle	1	18	6		0
Ribs	12	37	5		0
Scapula	1	39	4		0
Humerus	5	38	16		2
Radius	15	32	7.5		2
Ulna	8	34	8		1
Both bones.....	2	22	30		0
Carpus	6	28	4		1
Metacarpals	8	35	6		2
Phalanges	44	37	5		3
Spine	7	38	52		1
Pelvis	15	57	26		0
Femur	5	44	44		1
Patella	2	37	19		0
Tibia	7	46	14		2
Fibula	5	40	10		1
Both bones	8	48	28		7
Ankle	4	40	18		2
Tarsals	8	42	14		2
Os calcis	9	45	16		8
Metatarsals	10	33	10		2
Phalanges	40	35	3		0

227

Group V.—In Group V are the fractures. Of the entire number of injuries 11.4 per cent were fractures, and of these 16 per cent showed some permanent disability, varying from 5 per cent in the fibula to 60 per cent in the foot. Three radial fracture cases with an average age of forty-two years had an average 13 per cent permanent loss of wrist function. Eight cases of impacted comminuted fracture of the os calcis had an average 20 per cent loss of function of the foot—the average age being forty-five years. In the tibia-fibula group of permanent disabilities five of the cases were compound comminuted fractures, average age fifty plus and an average disability of 30 per cent loss

of ankle function; while two others in this group had 17 per cent permanent loss of ankle function. One man with a compound metatarsal fracture who had received 1,500 units of antitetanic serum immediately after the accident developed tetanus five weeks after the injury, and was given 310,000 of antitetanic serum and made a complete recovery. In the immediate treatment of fractures traction splints should be applied before the patient is removed to the hospital and before hemorrhage or much muscle spasm has developed because when this has occurred reduction is always more difficult. Compound fractures, if from a spicule puncture from within, are usually sterilized and sealed, and where the compounding is from without, thorough debridement and suture is done. Antitetanic serum is given in all compound fractures. Skin or skeletal traction was used in the treatment of these fractures. Passive massage and early movement was instituted while traction was maintained. Consolidated union was established in all cases.

Miscellaneous.—In the miscellaneous group which consists of six cases there are two cases of interest: one an infected pilonidal cyst following trauma over the sacrum; and the other rupture of the ileum following direct trauma to the abdomen, with a fatal termination within forty-eight hours.

Two deaths occurred in this series of cases, one a transverse myelitis following fracture of the spine, and the other a ruptured ileum following trauma.

The wide variances in estimating disability is usually found in Permanent Partial disability, and it is imperative that the medical profession adopt some standard of estimating disability before uniformity in these evaluations can be obtained. Henry H. Kessler, medical director of the New Jersey Rehabilitation Clinic, has presented a simplified method by which the various factors causing disability may be measured. He takes function to represent the true measure of disability. Function resolves itself into three physiological factors, namely, motion of the joint, strength of the muscles and coördination and control from the brain through the peripheral nerves. The measurement of these factors is used as a basis for determining function in the extremity. To secure uniform results, only objective findings may be used in determining function. Only active motion should be measured. In estimating function in the hand there are three component parts that must be considered: (1) the grasping power for small objects between the folds of the fingers; (2) the grasping power for large objects between the fingers and the palm of the hand; and (3) the opposition between the thumb and the tips of the fingers. All medical, surgical and occupational therapy, as well as physiotherapy, must be given a complete trial before final estimation of permanent disability is made.

The same general principle is followed in estimating function in the lower extremity, with weight bearing assuming the place that prehension occupies in the upper extremity.

EMERGENCY SURGERY OF THE ABDOMEN*

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IN THIS discussion I wish to confine myself to a consideration of the nontraumatic intraabdominal lesions and more particularly do I wish to stress the early recognition of the more frequent acute emergencies and their differential diagnosis.

Moynihan has aptly stated in speaking of the early recognition of abdominal emergencies, "This is the one department in Medicine in which the practitioner should be most familiar. Acute abdominal emergencies call for skill and prompt action as in no other field of Medicine."

Zachary Cope states:

"Acute abdominal disease furnishes one of the best examples of the great value of clinical experience in diagnosis. The laboratory has little or no place in the diagnosis of acute appendicitis or the perforation of a duodenal ulcer.

"In these days when it is the tendency to belittle clinical diagnosis, it is all the more important that we should stress those conditions that depend for successful treatment upon early diagnosis."

Bevan has emphasized the theory of probabilities in the interpretation of abdominal lesions, for example: a boy of twelve years with abdominal pain should suggest appendicitis; a young woman with abdominal pain, salpingitis or ectopic pregnancy; a middle aged woman with upper abdominal pain, gall-bladder disease.

Oftentimes the differential diagnosis of an acute abdominal lesion cannot be definitely made. In such a case one must recognize that an acute abdominal emergency exists and exploration performed and the diagnosis confirmed later.

As regards the incidence of acute emergencies and their relative occurrence, Butler has shown in a study of 1,802 acute surgical abdominal cases that acute appendicitis occurred 997 times, or in approximately one-half the cases. The remaining 50 per cent were made up of the following in this order: hernias (incarcerated or strangulated), gun shot wounds, bowel obstruction, perforated ulcer, multiple abdominal injuries, ectopic pregnancy and acute cholecystitis.

During the year 1932 there were performed in St. Mary's and St. Luke's Hospitals, Duluth, 386 operations for acute abdominal emergencies. Two hundred ninety-six, or approximately three-fourths of the cases, were for acute appendicitis. The remaining one-fourth comprised in this order: obstruction (including strangulated hernia), acute cholecystitis, ectopic pregnancy and perforated ulcer. There was one each of the following: Meckel's diverticulitis, perforated ulcer of the ileum, twisted pedicle of an ovarian cyst, torsion of the omentum, intussusception, volvulus, ruptured viscus, ruptured bladder and ruptured spleen.

Acute appendicitis then is the most frequent intra-abdominal emergency. It is estimated that 20,000 people die yearly from appendicitis in the United States. During the past two decades the mortality rate has apparently increased. Kolodny states that the relative frequency of death from appendicitis in this country was 11.4 per 100,000 in 1910 and 18.1 in 1930. He ascribed this increasing mortality to delay and the casual operator. Wilkie has stated that the death rate is the same as twenty years ago. Deaver has said that purging, the failure to call the physician early, or the failure of the physician to recognize the condition, and expectant treatment are factors in the increasing mortality of appendicitis.

The classical syndrome of acute appendicitis, as described by Murphy, is well known: a fairly rapid onset of upper abdominal pain, associated with vomiting; after a few hours localization of the pain to the right lower quadrant, slight fever, and tenderness over McBurney's area. Murphy failed to distinguish between the acute non-obstructive and obstructive types.

Wilkie states that the case of non-obstructive inflammatory appendicitis is usually recognized early, and that 90 per cent of deaths from acute appendicitis occur in the obstructive type.

Anomalous positions of the appendix (retrocecal, intrapelvic, subhepatic or left sided) may give rise to difficulties in diagnosis. However, it is always well to keep in mind the significance of local tenderness, muscle spasm and hyperesthesia in the localization of an inflammatory process.

It is well to recognize that every acute inflammatory intraabdominal lesion may simulate at times acute appendicitis. In children one must frequently distinguish acute appendicitis from enteritis and the parenteral infections, pyelitis and pneumonia.

In enteritis or enterocolitis the onset is less acute, the pain is more distinctly colicky in type, vomiting and diarrhea are more evident, abdominal tenderness and rigidity are less pronounced and hyperesthesia is absent.

The recognition of pyelitis may be difficult because its onset may not suggest genito-urinary disease. Pain beginning on the right side, associated with high fever, frequency and burning urination and pus in the urine, point to the correct diagnosis.

Pleurisy and pneumonia may mimic acute appendicitis. Sudden high fever, increased pulse, abdominal breathing, circumoral pallor and flushed cheeks may suggest its onset. In pneumonia there is an early and marked leukocytosis. Abdominal tenderness and rigidity are less evident and hyperesthesia is absent. An x-ray plate of the chest in any questionable case will oftentimes make clear the diagnosis.

*From the Duluth Clinic. Read in Symposium on Emergency Surgery before the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 24, 1933.

Less common conditions in children which may simulate acute appendicitis are acute infectious diseases, especially those involving the upper respiratory tract, Meckel's diverticulitis, intussusception, mesenteric adenitis and pneumococcal peritonitis.

In young women acute appendicitis most frequently is confused with pyelitis or pyelonephritis, salpingitis and ectopic pregnancy. In acute salpingitis the patient appears less ill. Vomiting is rarely present. The pain and tenderness are more diffuse. Abdominal rigidity and distention are more pronounced in the lower abdomen. Vaginal examination will show the uterus and adnexa to be tender and perhaps fixed. A smear from the cervix may be positive.

In early or mid-life acute appendicitis is most often confused with acute gall-bladder disease, obstruction, ruptured gastric or duodenal ulcer or acute diverticulitis. Diverticulitis should be considered in any patient over forty, with discomfort in the lower abdomen, especially in the left iliac fossa, with fever, distention, vomiting, irritability of the bladder, diarrhea or constipation, and melena.

Mechanical obstruction is the second most common acute abdominal emergency. External strangulated hernia makes up almost two-thirds of this group.

The importance of the early recognition and institution of prompt surgical relief has been re-emphasized by Wangenstein and others. McIver has stressed that there are three factors which influence mortality:

1. The degree of injury to the blood supply of the affected loop.
2. The level of the obstruction.
3. Most important, the time elapsing between the onset of obstruction and its relief. That there is an increasing mortality with delay is shown by the fact that in patients operated upon within eight hours the mortality is reported less than 8 per cent, while after forty-eight hours it is recorded as high as 69 per cent.

The symptoms and signs which should lead to early diagnosis are: acute, intermittent, colicky pain usually followed in a few hours with distention and vomiting, with an absence of abdominal rigidity, tenderness, fever and leukocytosis. The importance of auscultation of the abdomen and the visualization of gas in the small bowel or fluid levels has been repeatedly mentioned by Wangenstein. One should not wait to determine the place or character of the obstruction.

Acute gall-bladder disease, hydrops, empyema, gangrene and perforation is the third most frequent acute abdominal lesion. Acute cholecystitis is ordinarily not an emergency. Miller states that it rarely occurs in the absence of stones. Acute obstructive cholecystitis is characterized by a sudden attack of typical radiating biliary colic. Epigastric agony may be intense. Marked rigidity of the right rectus muscle is present with tenderness on palpation. Vomiting is usual. A gradually developing, tender, indistinct mass indicates the spread of infection. Jaundice may be present in the complicated cases. Cases with persistent fever, tenderness and pain should be operated without delay.

The more important conditions which are to be considered in its differential diagnosis are acute appendi-

citis, obstruction, acute pancreatitis, coronary thrombosis and perforated ulcer.

Pancreatitis exhibits every degree of acuteness. It should be borne in mind in every case of acute abdominal pain with persistent vomiting and collapse. In a series of 232 cases a correct diagnosis was made in only 31 per cent. In view of the high mortality, 51.2 per cent in compiled statistics of 1,278 cases, many surgeons recommend expectant treatment. The dangers of operation beside the immediate operative risk are: secondary hemorrhage, pancreatic asthenia, persistent sinus and ventral hernia. In acute pancreatitis there is severe pain referred to the back or loins, rapid feeble pulse, vomiting, collapse and cyanosis. The upper abdomen is diffusely rigid and tender and there is a high leukocytosis.

Coronary thrombosis usually occurs in males between the ages of thirty-five and fifty-five years. It comes on with severe pain, epigastric or substernal, and is associated with apprehension and prostration. The pulse may be feeble and increased in rate, the face and brow pallid and bathed with sweat. The blood pressure is usually low. The upper abdomen may be full, but there is no marked tenderness or rigidity. There is an early leukocytosis and fever.

Ectopic pregnancy was the fourth most frequent acute emergency in our series. Urdan in a study of a series of cases states that a correct diagnosis was made in only 58 per cent. Except in those cases of severe bleeding the diagnosis may be difficult. The condition occurs usually before thirty-five years of age and pelvic infection is an important causative factor. The classical picture is one of acute abdominal pain followed by collapse, anemia, low blood pressure, subnormal temperature, rapid thready pulse and air hunger in a young woman of twenty-five to thirty-five years of age, who frequently has not had a child for some time and recently has missed one or two periods. With this are signs of early pregnancy, a tender, full, rigid abdomen, sometimes rectal tenesmus and bladder irritability and on vaginal examination a mass on either side of the pelvis.

In our experience, ectopic pregnancy has been confused most often with acute salpingitis or acute appendicitis. The Aschheim-Zondek test may be conclusive. A sedimentation time of thirty minutes or over will indicate ectopic rather than inflammatory disease.

Perforated ulcer is the final major acute abdominal emergency which I wish to consider. In males over twenty years of age, if appendicitis can be excluded, the commonest abdominal emergency is for ruptured ulcer. Moynihan's classical description of this condition is so exact that I cannot do more than repeat it.

"There is intense agony, the face is pale and haggard, anxious and appealing. The eyes wide and watchful. The face bathed in sweat. Respirations short and panting and wholly costal. Words spoken are jerked out in expiration only. The body is rigid and motionless. No movement dare be attempted. If an endeavor is made to touch the abdomen, the patient's hands are at once lifted in protest and in protection. The chest and abdomen remain motionless. The patient is cold, temperature subnormal. The abdomen is immobile and more rigid over the area involved. For the first hour or two the pulse is not

increased or diminished in volume. The blood pressure is normal. There is no shock. After a few hours the temperature and pulse rise. The abdomen becomes fuller. Vomiting begins. Extravasated duodenal contents may trickle down along the right colon to the right lower quadrant and thus confusion with appendicitis may follow."

In subacute perforations the diagnosis may be more difficult.

Probably the most common diagnostic error is in assuming the condition is one of acute appendicitis. Other abdominal lesions which must be differentiated are acute cholecystitis, acute pancreatitis, coronary thrombosis and more rarely mesenteric thrombosis or embolism, dissecting aneurysm and tabetic crises.

In summarizing, I wish to stress that acute appendi-

citis, obstruction, acute gallbladder disease, ectopic pregnancy and perforated ulcer together make up approximately 95 per cent of all abdominal emergencies; and further, acute appendicitis alone makes up about 75 per cent of abdominal emergencies. Appendicitis may at times be the most easily recognizable condition, and perhaps just as often the most difficult. There is no other field which will test one's diagnostic acumen as in the acute emergency lesions of the abdomen. Even after the most painstaking history, examination and effort to make a correct differential diagnosis there will still be errors committed.

In the words of Maxon:
"We will all make mistakes, even the youngest of us!"

ACUTE APPENDICITIS IN CHILDHOOD*

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MOST parents, and I am inclined to believe a good many physicians still fear the word "appendicitis" in relation to abdominal pain in childhood. Perhaps we are at fault that this state of affairs should still exist, and result in so many disasters. Who of us have not seen children, victims of the diagnosis of enteritis, colitis, stomach "flu," etc., develop peritonitis from a perforated appendix and die?

This exposition concerns itself with acute appendicitis in childhood, and I propose to put it before you from a purely clinical standpoint. Let us deal with this disease occurring under twelve years of age as I feel it differs enough from that seen in older children and adults to warrant our earnest consideration and demand our constant attention. To be sure acute appendicitis is uncommon in infancy, yet after the first year of life it is the most frequent acute surgical condition arising within the abdomen.

The majority of adults suffering from their first attack of acute appendicitis will recover without surgical intervention. On the other hand the same disease in children is exceedingly dangerous because of the frequency and rapidity with which gangrene, perforation and peritonitis occur.

ANATOMY

In the infant the iliocecal apparatus is somewhat higher than McBurney's point, and the cecum is often above the anterior superior iliac spine (Piersol).

Gundobin noted that in 6 per cent of infants the appendix descended into the small pelvis, and in 22 per cent of the cases was retrocecal.

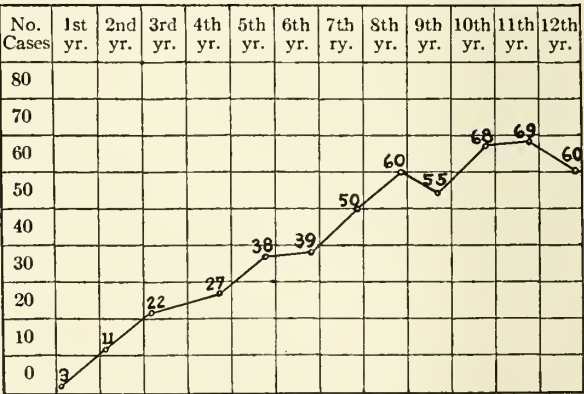
Christopher states that in the earlier years of life there exists a larger communication between the appendix and the cecum.

*Read in Symposium on Emergency Surgery at the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 24, 1933.

During the first two years of life the amount of lymphoid tissue in the wall of the appendix is comparatively small. After the second year this tissue begins to grow, and extend, reaching its maximum growth about the twentieth year.

Always bear in mind that the appendix may lie in an abnormal position, due to incomplete rotation of the bowel, or a mobile cecum.

AGE PERIOD (FRASER)
500 Cases of Acute Appendicitis in Children



AGE INCIDENCE

Under six years of age, acute appendicitis is supposed to be an infrequent disease. However, the number of cases is increasing and one cannot but feel that either the disease is on the increase, or the diagnosis is being made earlier.

Kelly, in reviewing 16,000 cases, found only 2.5 per cent under five years of age.

Diess, on the other hand, reported 25 per cent of his cases under the age of five.

All statistics show that the first year of life is quite free from the disease. During the second year it is infrequent and after that the incidence rises quite rapidly.

Fraser assures us that no period of life is entirely free from the disease. He had four cases of acute appendicitis in nursing infants.

Fraser's figures show 30 per cent of the cases under six years of age, which is a considerably higher percentage than American statistics show. A review of the British figures indicate that they are diagnosing and operating for acute appendicitis at an earlier age in England than in America.

ETIOLOGY

Fraser points out that the explanation of the age incidence in childhood may be found in several facts.

1. By the relative amount of lymphoid tissue present in the appendix at different periods of life.

2. By the fact that the toxicity of the intestinal flora alters as the child grows older. In most cases the *Bacillus Coli* is the responsible organism. Soon after birth its virulence is comparatively slight, but as the child grows older the virulence is stimulated by the increasing complexity of the diet and by the incidental attacks of gastroenteric catarrh.

3. Influences of terminal blood supply and the gastroenteric infections from carious teeth are also applicable in children.

Bolling believed that sex had no influence, and was convinced that a frequent cause of necrosis and perforation was a fecolith.

Porter reported that in 60 per cent of his cases there was a history of tonsillitis.

In 1909 Frasca emphasized "indisputable relationship of cause and effect between affections of the nasopharynx and the appendix." He thought that the infection was transmitted by the digestive tract or the blood stream.

Infectious diseases, familial predisposition, and mechanical causes, such as kinks and twists, are thought to have an etiological role.

Abt believed that traumatism and diseases of the alimentary tract played a role. He warned us to watch for appendicitis during and after tonsillitis, and the acute exanthemas, especially measles.

In gangrenous appendicitis worms are not common, and very little proof can be found that gangrenous or suppurative appendicitis results from parasitic infection (Howland).

Thus a review of the literature reveals that the exact etiology of appendicitis is still very much in doubt.

DIFFERENTIAL DIAGNOSIS

The problem of differential diagnosis in children is always more difficult than in the adult. A few conditions occur in the adult which never need consideration when dealing with children. On the other hand many conditions occur in children which may be mistaken for appendicitis. I shall attempt to classify the most important of these conditions, and enumerate the points which are of aid in the differential diagnosis.

1. CARDIO-RESPIRATORY SYSTEM:

A. *Pneumonia*.—When dealing with young children an aphorism of Trousseau's should always be kept in mind. "Whenever a child complains of pain in the abdomen, examine his chest."

Because of the frequency of pulmonary disease in young children, appendicitis is often thought to be pneumonia. In older children pneumonia is often thought to be appendicitis, and many unnecessary operations have been done because of this error.

Adam and Berger stated that twenty-five patients out of one hundred and forty-five with lobar pneumonia were sent to the Boston City Hospital with a diagnosis of appendicitis. The diagnosis was based on abdominal pain, tenderness, vomiting, fever, and a p.m.n. leukocytosis.

Howland states that the child with pneumonia looks sick, his cheeks are flushed, all nasal are at work, the respiratory rate is increased and the breathing may be grunting in character and is always abdominal in type. He is restless and irritable, his temperature is usually above 101, and the leukocyte count is usually over twenty thousand. The child with appendicitis has a pale facies, he lies quietly in bed and ordinarily dislikes to move his right leg, and respiration is costal in type.

Well defined general symptoms of primary lobar pneumonia do not necessarily mean well defined physical findings. When the lesion is central in character the physical findings are usually late in appearing.

The abdominal tenderness of pneumonia is so superficial and so little influenced by deep palpation that it suggests hyperesthesia. Likewise the tenderness is less marked than the pain.

In border-line cases I have found the x-ray of extreme value in helping to diagnose central pneumonia.

B. *Throat Infections*.—Abdominal pain is a frequent complaint either in sporadic or epidemic forms of sore throat. Certainly in some cases it is the most prominent symptom.

Brenneman thinks that this is the most frequent single abdominal pain encountered in childhood beyond the period of infancy. He says the pain is commonly paroxysmal, sometimes mild, and sometimes severe. The pain is usually greater than the tenderness, the reverse of appendicitis. We must never forget however that acute appendicitis is frequently a complication of upper respiratory infection.

C. *Pericarditis*.—Pericarditis can produce acute abdominal pain, but it is extremely rare. The enlarged precordial area and friction rub should be picked up on general examination.

2. GASTRO-INTESTINAL SYSTEM:

A. *Colic*.—Brenneman states that colic is the most frequent, most distressing and easiest recognized of abdominal pains of infancy. Its early age incidence places it at a time when other severe pains are infrequent. Its paroxysmal character, daily periodicity, varying, agonizing course, and sudden departure, improvement when pressure is applied, complete relief when flatus is expelled, and lack of fever leave no

doubt as to the diagnosis. Real major colic is always intestinal in origin.

B. *Chronic Indigestion*.—Again Brenneman tells us that babies with chronic indigestion cry a good deal from abdominal distress. The condition is usually constant, not as severe as colic, and usually is accompanied by evidences of dyspepsia such as diarrhea. These babies pass gas and feces and cause no concern as to the presence of intestinal obstruction.

C. *Ileo-colitis*.—In this condition the tenderness is not localized. Fever is rare. Vomiting usually stops when the stomach is empty. Diarrhea precedes pain and there is no leukocytosis.

D. *Cyclic Vomiting*.—To differentiate cyclic vomiting from acute appendicitis may be extremely difficult, but to operate unnecessarily during a vomiting crisis may result in disaster.

E. *Constipation*.—Constipation can be ruled out by history and rectal examination.

F. *Pyloric Stenosis*.—Age is against appendicitis. Projectile type of vomiting is not seen in appendicitis. Pain is seldom severe. These babies usually fuss and squirm from discomfort which is present with visible gastric peristalsis.

G. *Intussusception*.—The type of pain is characteristic. Infant usually squirms and changes position at regular intervals. Blood and mucus are in the bowels without the presence of fecal material. Palpation of a sausage shaped tumor clinches the diagnosis. This condition usually occurs in the first year of life with sudden onset and considerable degree of shock.

H. *Intestinal Obstruction*.—Intestinal obstruction due to a volvulus or a band is rare in childhood. A tight anal sphincter may give abdominal distension and pain. The x-ray will be of value.

I. *Acute Mesenteric Lymphadenitis*.—In this condition I do not believe that a positive diagnosis can be made. The tendency is for it to disappear following laparotomy. Even when this condition is suspected I think operation should be performed for fear it may be present.

J. *Cholecystitis and Pancreatitis*.—As yet we are unable to make a differential diagnosis in these conditions, but fortunately they are very rare.

K. *Primary Peritonitis*.—This condition may be due to pneumococcus, staphylococcus, streptococcus, or gonococcus. A differential diagnosis is impossible without some operative procedure.

L. *Tuberculous Peritonitis*.—The clinical features are obstructive symptoms, severe colicky pains and marked distension.

M. *Meckel's Diverticulum*.—This condition must always be thought of and looked for when operating for acute appendicitis. Differentiation is unlikely.

3. GENITO-URINARY SYSTEM:

A. *Pyelitis*.—The pain and tenderness may simulate retrocecal appendicitis. Marked tenderness may be present in the kidney region but is usually absent. Rigidity is not present. Temperature is higher than physical signs indicate, and usually saw-tooth in type. Painful urination with pus in the urine may occur

in appendicitis. A single specimen without pus does not exclude pyelitis, and more than one specimen should be examined in doubtful cases.

B. *Ureteral Stone*.—If in doubt search for blood in the urine, and x-ray the suspicious region.

C. *Distension of Bladder*.—Smooth pear shaped tumor will be present. Catheterization will rarely be necessary.

4. INFECTIOUS DISEASES:

A. *Measles*.—Helmholz urges us to constantly have in mind the abdominal prodromes of acute infectious diseases. Many a child with measles has been operated upon for appendicitis. We should always think of measles and be sure of appendicitis. Koplik's spots should be looked for, and likewise a leukopenia. Appendicitis complicating measles is serious.

B. *Typhoid Fever*.—Rose spots, Widal reaction, bacilli in stools, and leukopenia without an increase in the polymorphonuclears are your guides.

5. STRUCTURAL SYSTEM:

A. *Tuberculous Spondylitis*.—The tenderness and rigidity of the spine always precede any abdominal symptoms. X-ray.

B. *Osteomyelitis—Ileum or Femur*.—Pressure on the bone is extremely painful. Temperature and leukocyte count are very high. X-ray.

C. *Acute Suppurative Arthritis, Right Hip*.—These cases have been mistaken for appendicitis. Movement of joint is extremely painful. Careful history, observation and examination. Royster says, "Remembering that appendicitis is an abdominal disease is the solution."

The literature mentions cysts of mesentery, cysts of omentum, dermoid cysts with twisted pedicle, ovarian cysts with twisted pedicle, salpingitis, torsion of omentum, torsion of undescended testicle, retroperitoneal abscess in iliac fossa, inguinal and femoral adenitis, meningitis, pyelonephritis, and vomiting of acidosis.

DIAGNOSIS

My feeling about the diagnosis of acute appendicitis in children is that it is an abdominal crisis which, as Adams states, requires the mind of a physician to diagnose and the hands of a surgeon to treat.

Late recognition of this disease, in children, rather than its rapid course and lack of resistance, is probably the cause of our high mortality. The urge to procrastinate is always present in the case of children in the hope that it may not be appendicitis.

I must also be appreciated that it is a difficult problem to diagnose appendicitis in children, especially under six years of age. Yet it is a problem which confronts, and must be met by, every physician. Frequently the diagnosis is made when the child is suffering from some other ailment, but more often the diagnosis is not made when the child is actually suffering from appendicitis. We can readily appreciate that subjective symptoms in young children are not very reliable, and that objective symptoms are usually difficult to elicit and evaluate.

When the disease is still confined to the appendix the appearance of the child may be one of comparative well-being.

Farr states that the present status of our ability to make a diagnosis in young children may be likened to our ability to make the diagnosis in adults 35 years ago.

A history of previous attacks should never be relied upon too much in young children. Never permit a child to have a second attack of appendicitis. If you suspect appendicitis observe the child every two hours. Any child with abdominal pain and vomiting must be considered a potential case of appendicitis.

Most writers believe that the onset is gradual, while some feel that it may be sudden. From my experience I am inclined to believe that the disease has a gradual onset.

In spite of the fact that the disease is uncommon in young children it must be considered in every case of obscure illness.

Howland says, "It is trying to the patient, the family, and the physician, nevertheless we must make a thorough examination, in order that we may properly treat the case."

SYMPTOMS

Pain.—I believe that pain is always present, although the child may deny it because of fear of the "Doctor." The pain, at first, is usually generalized. It may be referred to the back, the pelvis, or upper abdomen, but ordinarily is present in the region of the umbilicus. The pain in most instances is paroxysmal in character, but it may be continuous. The young child invariably calls it a "hurt."

In Bolling's series pain was the initial symptom in 90 per cent of the cases.

Muller and Ravdin say:

"Many writers on the subject have erroneously stated that the pain of appendicitis in children varies because of the variation in position of the appendix, depending as it does on the rotation of the colon and the descent of the cecum.

"This is fallacious, however, since the appendix receives its nerve supply through the abdominal sympathetic in embryonic life. This innervation is constant and does not depend upon the anatomic position of the appendix. Disturbed action of the sympathetic nervous system as the result of a lesion in the appendix is the chief cause of the symptoms as long as the inflammation is localized to the appendix. The sympathetic fibers make constant connections with the various spinal segments. Since the sympathetic nerves do not contain fibers, the sensation of pain is in some way associated with a reference of the stimulus to the cutaneous distribution of the spinal nerves, with which the sympathetic makes its central connection.

"Tension within the appendix probably initiates the stimulus that calls forth the sensation of pain in the distribution of the tenth and eleventh intercostal nerves. Pain is therefore first referred to the region of the umbilicus.

"When inflammation spreads to the surrounding structures the pain is felt in whatever location the appendix is. This secondary pain is the one that is diagnostic of the exact location of the appendix. The secondary pain is an expression of an irritation of the somatic sensory nerves, the result of inflammation of the subperitoneal tissues."

Holt says that restlessness, irritability, and the character of the child's cry are useful in the determination of pain.

Drachter called our attention to the fact that children, be they ever so ill with pneumonia or other febrile diseases, usually sleep for long stretches; but the child with abdominal pain will not sleep, and will not let anyone else sleep.

The pain is of moderate severity, but if peritonitis be present it may be increased with urination or defecation. Churchman reported a case that was sounded for stone because of painful voiding. I recall a case where the outstanding symptom was pain on urination. The child presented a perforated appendix.

If the child can assume the sitting position without making the pain worse, it speaks against appendicitis. If the child limps when allowed to walk, be suspicious of abdominal pain, but watchful for an acute process in the region of the right hip joint. When constant and moderate pressure is applied over McBurney's point, raising the right leg with extended knee increases the pain.

In my observations the child usually lies on the right side, with the right knee drawn up, which relaxes the psoas muscle and thereby lessens the pain.

Among practitioners of children's diseases it is a well recognized fact that children do not ordinarily complain of pain unless it is quite severe. Perhaps under six years of age the human organism is not as sensitive to pain. In many cases of appendicitis, no doubt, the average child has had abdominal pain long before he complains of it. Hence we must be conscious of this fact and give it due consideration when taking the history.

An adult complaining of pain may not have any pain at all, but the child complaining of pain has pain, and it is our task to find the cause.

I feel that abdominal pain is the most constant symptom of appendicitis in children and must never be considered lightly.

Fever.—In children the temperature is moderately elevated in an attack of appendicitis. It will range between 99 and 102. A temperature over 102 should be a warning to look for a cause other than simple acute appendicitis. On the other hand, never be misled by absence of temperature because gangrenous appendicitis may be accompanied by a normal or even subnormal temperature. As an aid in a differential diagnosis I do not think that much reliance can be placed upon the temperature reading.

Leukocyte Count.—The leukocyte count is usually elevated, ranging between 12,000 and 18,000 with a definite polymorphonuclear increase. A count over 20,000 leukocytes in a supposed case of appendicitis, without complication, should be looked upon with suspicion. The same holds true regarding a normal leukocyte count as was said for temperature in cases of gangrenous appendicitis.

The explanation of normal temperature and leukocyte count in cases of gangrenous appendicitis is found in early thrombosis of the mesoappendiceal blood vessels, preventing absorption of toxins into the general circulation, and therefore preventing general systemic reactions.

In doubtful cases I believe that the differential count

is of greater value than the total count, a leukopenia without an increase in polymorphonuclears usually excluding appendicitis.

Vomiting.—Vomiting is nearly always present but very rarely is persistent. Ordinarily vomiting occurs once or twice and usually succeeds the onset of pain.

Bolling reported three cases without pain, the attack being initiated by persistent vomiting. In four of his cases vomiting did not occur at all.

Holt believed that vomiting was probably the most constant symptom.

Of Beckman's forty-three cases under five years of age, thirty-six began with vomiting.

On the other hand, Abt says that vomiting occurs so frequently in the gastro-intestinal, nutritional, and toxic diseases of infants, that very rarely can it be considered pathognomonic. To be sure, vomiting can not be considered pathognomonic of appendicitis, but it plays its part in the picture.

Disturbed Bowels.—Constipation occurs rather frequently, diarrhea is rather infrequent, but normal bowel movements, in my experience, are by far most common.

Howland reminds us that when the stool contains mucus we must not be satisfied with the diagnosis of enteritis, or dysentery.

Tenderness.—Abdominal tenderness is practically always present; rarely is it difficult to elicit in children over three years of age. In my experience with appendicitis in children, I have had only one case without tenderness.

Localization of tenderness may be difficult, but by careful, gentle, and tactful palpation the patient will nearly always tell you that it "hurts" more on the right side than the left. The tenderness may be apparently as severe in the upper right quadrant as in the lower, but as you gain the patient's confidence, you will in most instances be able to determine that the real tenderness is in the lower right quadrant. If, however, the child repeatedly insists that one part of the abdomen is as tender as another, peritonitis may already be present.

Holt thinks that it is practically impossible to localize tenderness under three years of age, and I agree with him.

Helmholz and Bolling believe that definite tenderness in the right lower quadrant in the region of McBurney's point is the most conclusive single bit of evidence in making the diagnosis of appendicitis in children.

Bolling in all cases but one found tenderness. He says that if tenderness is corroborated by pain, vomiting, elevation of temperature, and leukocyte count, the diagnosis is reasonably sure. When, however, he can convince himself that there is no local tenderness, he hesitates to make a diagnosis.

A retrocecal appendix, one in the pelvis or extending across the midline, makes the evaluation of localized tenderness difficult. Occasionally tenderness may only be elicited by rectal examination.

Rebound Tenderness.—Rebound tenderness, when present, is a valuable sign of peritoneal involvement. I recently saw a ten-year-old girl in whom the only

positive abdominal finding was rebound tenderness. Operation revealed beginning peritonitis.

Rigidity.—Muscular rigidity can be obtained as easily in older children as in adults, but in young children it is more difficult to determine. In the crying child under three years of age it is impossible to determine.

Howland believes that when it is found it is perhaps our most reliable symptom of acute appendicitis in children.

Palpation should never be started until you have gained the child's confidence. Learn his given name and use it. Commence on the left side, never using more than the finger tips, and always be gentle. Deep palpation early in the examination will nullify all palpatory findings. You have hurt the child and at once he becomes fearful of all further examinations. It should be withheld until the end of the examination, and then used only to determine the presence of a tumor. Occasionally if the tumor mass is low down it can only be palpated by rectal examination.

Cope states that rigidity is a common sign, not of appendicitis, but of the accompanying parietal peritonitis.

Tympanites is indicative of extensive peritoneal involvement.

Spasm.—Muscular spasm is an unreliable sign in children.

TREATMENT

Acute appendicitis in children is an emergency surgical disease, to which rule there is no exception. The most experienced surgeon cannot tell the outcome in these cases. In those cases in which the suspicion is strong, but an absolute diagnosis cannot be made, I believe an exploratory operation is justified. The risk of a well done operation is not comparable to a neglected case.

Helmholz said, "It is better to operate on an occasional pneumonia thought to be appendicitis, than to let an acute appendicitis go to general peritonitis."

I believe entirely with Drachter when he says that the problem of appendicitis in the young child is chiefly one of diagnosis, and if operation is performed before there is general peritonitis or pocketing of pus, the mortality should be no greater, but should be even less than in the adult.

A child with abdominal pain should never be given a cathartic. Starvation and enemas should be the order of the day.

OPERATION

In abdominal operation on children, always bear in mind that gentleness and hemostasis are of utmost importance and should never be sacrificed for speed.

I employ the right rectus muscle splitting incision because I believe that it is safer when extensive disease is encountered, and likewise facilitates exploration when it becomes necessary.

Moist abdominal packs must be kept as near body temperature as possible. Cool packs increase the element of shock and consequently produce added risk to your patient's life.

Of late I have not practiced inversion of the stump. Ligation of the crushed base with chromic I gut and the usual phenol, alcohol treatment of the stump I am convinced is sufficient. My experience with this procedure has been favorable and I believe that it eliminates any future trouble in the wall of the cecum such as cysts or tumors. Do not attempt to cover the stump with the mesoappendix if such a procedure is going to affect the efficiency of the ileocecal valve.

Children under twelve years of age who show any evidence of peritonitis should be drained. For drainage soft rubber tissue will answer all purposes. Under no circumstances should gauze or hard rubber tubing be used. Do not close the wound too tightly about the drainage material. Multiple drains are not necessary; one to the ileocecal region and one in the pelvis are sufficient.

Ether administered by the "open drop" method is the anesthesia of choice.

POSTOPERATIVE CARE

Normal saline solution should be given as soon as the child is returned to bed. If the child presents any degree of dehydration give the fluid by hypodermoclysis, otherwise proctoclysis will suffice. Give at least 1000 to 1500 c.c. during the first twelve hours, and continue until sufficient fluid is being taken by mouth. Remember that proctoclysis is not satisfactory for any length of time in infants, but is well tolerated by older chil-

dren. Bolling recommended giving 3 per cent glucose solution by hypodermoclysis, but in my experience I have not found it necessary.

Bear in mind that children do not tolerate starvation, and some nourishment should be given during the second twenty-four hours.

As a rule very little sedative is required for children, and usually chloral hydrate or codein suffices.

Distention should be treated with repeated small enemas, gastric lavage, or nasal decompression.

Persistent vomiting responds very well to gastric lavage.

CONCLUSIONS

1. Observation and thorough examination are extremely important whenever a child complains of abdominal pain.

2. Any child with abdominal pain, vomiting and fever should be considered a potential case of appendicitis until proved otherwise.

3. The cardinal diagnostic points in order of importance are: (1) Localized tenderness; (2) muscular rigidity; (3) abdominal pain; (4) vomiting; (5) leukocytosis; (6) temperature.

4. Acute appendicitis in a child is always a surgical problem.

5. Late diagnosis and cathartics are responsible for perforation, morbidity, and high mortality.

STRANGULATED HERNIA*

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STRANGULATED hernia is first mentioned in the writings of Hippocrates who lived four centuries before Christ. Our first record of treatment dates back to the third century before Christ. It was Paragoras of Cos who at that time believed that the cause of strangulation was due to an accumulation of hardened feces in the protruding intestine. He advised taxis for its relief.

The treatment for strangulated hernia up to the sixteenth century was for the most part the use of taxis and adjuvants of taxis such as antispasmodics, cold compresses, warm baths, or fomentations to the abdomen. Opium and ipecac were also used. In the seventeenth or eighteenth centuries venesection became popular. At about this period tobacco came into rather common use, not, however, in the manner that it is used today, for we find that tobacco enemas and injections of smoke into the rectum by means of bellows were used to produce general depression. The symptoms of this depression were weak pulse, nausea, cold sweats,

and fainting, all of which were supposed to reduce the strangulation. The writings of those days show that many of these patients died but do not state whether death ensued as a result of the strangulated hernia or whether it was the result of tobacco poisoning.

It was Maupasius, in 1559, who performed the first operation for strangulated hernia, but apparently Pierre Franco developed the best operation up to his time in the sixteenth century. After exposing and reducing the hernia, he cut off the sac, retracted the edges, stopped the hemorrhage, and used caustic to produce scar tissue.

In the years that followed we find minor improvements made from time to time by such men as Dionis, Albert, Petit, Richter, Wutzer, and many others. Needless to say, following the work of Pasteur and Lister more progress was made between 1870 and 1890 by open operation than in all the preceding centuries.

Let us consider for a moment the statistics regarding strangulated hernia. According to my colleague, Dr. Paul Kelly of St. Paul, who spoke before this association in 1922, 2 per cent of some 500,000 men examined for industrial concerns were found ruptured, and of

*Read in Symposium on Emergency Surgery before the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 24, 1933.

those operated upon, less than 1 per cent had strangulation at the time of operation.

Listing hernias as to frequency of strangulation, we have the following order: (1) femoral; (2) umbilical; (3) inguinal; (4) ventral; (5) diaphragmatic.

Mr. Kingdom of London reports 6.7 per cent males compared with 1 per cent females ruptured, but the percentage of strangulation from hernia is much higher in women. In fact Berger found 14.06 per cent of hernias strangulated in women as compared to 3.61 per cent in men. This is probably accounted for by pregnancy and obesity as well as the higher percentage of umbilical hernias in women.

The age incidence of strangulation shows it to be more common in the old and middle aged; it is rare in infants, infrequent in children, and occurs rarely before the age of twenty.

Reviewing the herniotomies performed during a five year period at St. Joseph's hospital, Saint Paul, by the staff members, I found the record of 649 operations, forty of which (6.16 per cent) were for strangulation.

Twenty-four of these forty were in males and sixteen in females. Twenty were inguinal, thirteen femoral, four ventral and three umbilical.

Twenty-nine of the forty were operated upon within twenty-four hours of the first symptoms of strangulation, five within forty-eight hours, one in ninety-six hours, one in seven days, and in four no history was obtained.

Nineteen had bowel alone within the sac, eleven had bowel and omentum, eight had omentum alone, one had stomach, hepatic flexure, transverse colon, and descending colon, and one had transverse colon, testes, and omentum.

It was not necessary to resect bowel in any of the thirty-two cases where bowel alone, or omentum and bowel, were present. In five of the forty cases it was necessary to resect omentum. Four of these five were cases where omentum and bowel were present together and one where omentum alone was present.

In the forty cases, thirty-one stayed for an average of fourteen days. In three cases the hospital stay could not be determined. Death occurred in six instances and was attributed to shock, peritonitis, pneumonia, coronary occlusion, and intestinal obstruction.

Immediate operation must be performed in case of strangulation, and under no circumstances should taxis be attempted. I feel that I should apologize to this body for this self-evident statement, and yet, only six months ago, I saw a patient in whom taxis had been attempted with disastrous results.

Every surgeon has his own opinion, based on experience, regarding anesthesia in these cases. Nitrous oxide and ether must still be regarded as the most reliable. Spinal anesthesia at times is excellent but must be used with caution. Local anesthesia is questionable in that there is danger of infiltrating an inflamed field; furthermore, the hernial sac in these cases is usually edematous and thickened, frequently containing serosanguineous fluid. It is oftentimes difficult to recognize the structures and infiltration of novocain is

apt to make such recognition even more difficult than ever.

A primary bowel resection in cases in which the bowel is gangrenous has been attended, in our experience, with a high mortality. In such cases the bowel should be exteriorized and opened. It must be definitely ascertained that the proximal loop is not constricted at the inner ring or within the canal, so that free drainage of intestinal contents is assured. These patients are always in poor condition, and it is useless to attempt to do very much. If the patient survives the primary operation, it is rather an easy matter to resect the bowel and reestablish its continuity.

I wish to report the following case through the courtesy of one of the staff surgeons at St. Joseph's Hospital.

CASE REPORT

Mr. K., aged seventy-four, when first seen complained of terrific abdominal pains and nausea.

On examination he was found to be poorly nourished and seemed very ill. Retching was persistent. A tumor mass about the size of a hen's egg was present in the region of the right femoral ring.

Operation.—Under spinal anesthesia, the knuckle of intestine was exposed and found to be protruding from the femoral ring. It was very difficult to see the margins of the hernial ring, even though relaxation was complete. In an attempt to enlarge the femoral ring a sudden rather outspoken hemorrhage occurred which was thought to be due to a laceration of the deep epigastric vein. The blood vessel wall in which the rent was produced was sutured with fine plain cat gut and this seemed to control the hemorrhage. The operation was completed in the usual manner.

Within the first twenty-four hours after the operation the patient complained of a great deal of pain in his right leg, and it then became apparent that either the femoral vein or artery had been injured instead of the deep epigastric vein. The patient's condition grew suddenly worse. Abdominal distention and symptoms of peritonitis developed. Due to his age and general condition, surgical intervention seemed inadvisable without inviting certain fatality. The absence of vomiting, too, suggested the absence of intestinal obstruction. The pain in the leg continued but there was not a great deal of evidence of circulatory disturbance, such as discoloration, although there was some edema and swelling. Seventy-two hours following the operation the patient died.

At postmortem examination there was evidence of a low grade peritonitis. The portion of the bowel which had been obstructed and which was within the hernial sac before the operation was seen lying loose in the abdominal cavity and free from obstruction. However, about eight inches proximal to this area the ileum had become attached to the parietal peritoneum below and to the inside of the femoral ring area which had produced a complete obstruction with distension proximal to this area.

In the region in which the blood vessel repair had been made, it was found that the femoral artery for a distance of one inch had been lacerated. The sutures were holding, but a thrombosis had occurred in the lumen at this point which apparently had produced an almost complete occlusion and was responsible for the circulatory disturbance in his right leg.

The question arises in cases of strangulated femoral hernia whether the reduction should be performed from without or within the peritoneal cavity. In this particular case there is no doubt in my mind that if the operation had been done from within, the obstruction from which he died could have been corrected or prevented, and, surely, the injury to the blood vessel could undoubtedly have been avoided.

In two cases of strangulated inguinal hernia which I operated upon recently the loop of bowel was firmly adherent to the neck of the sac. The bowel was very dark in color and friable. I was unable to release it without fear of laceration or perforation. Even though there was considerable bloody fluid in the hernial sac, I did not hesitate to open the abdomen, and with one finger in the hernial ring and the other hand in the abdomen, I was able to free the adherent bowel and pull it into the abdominal cavity. In this way it was an easy matter to note the peristalsis of the bowel and to determine its viability. In both these cases it was unnecessary to resect. The abdomen was closed, and the hernia repaired in the usual manner with eventual complete recovery.

Dr. W. C. Carroll of Saint Paul informs me that in

his cases of strangulated femoral hernia, he cuts Poupart's ligament a distance of one-half inch from the pubic bone. This gives excellent exposure, opens the canal, and eliminates the danger of injuring the large blood vessels.

CONCLUSIONS

1. Strangulation of a hernia is becoming less frequent because of herniotomies properly performed.

2. Resection of the bowel in strangulated hernia is becoming less necessary because of early recognition of the condition and early operation.

3. The surgeon should not hesitate to open the abdomen if he encounters any difficulty in reducing an adherent bowel which has commenced to become gangrenous in the case of strangulated femoral or inguinal hernia.

CASE REPORTS

PELLAGRA FOLLOWING LACK OF ANIMAL PROTEIN*

RICHARD M. BURKE, M.D.
Oak Terrace, Minnesota

Occasional cases of pellagra are seen in the Northwest. O'Leary¹ at the Mayo Clinic encountered seventy-six during the past five and one-half years. The Minneapolis General Hospital, for approximately the same period, reports fifty-four cases, while the Minnesota General does not average one a year. The latter hospital cares largely for rural patients and does not encounter the alcoholic type which makes up the bulk of the city cases. In the State of Minnesota there were thirteen pellagra deaths reported during the past five years. This rate is slightly higher than for the preceding years.

Pellagra may be roughly divided into three classes: (1) simple or dietetic pellagra; (2) post-alcoholic pellagra; (3) secondary pellagra. Judging from the cases reported in the literature,² the last two classes approach simple pellagra in frequency in this area. Simple pellagra, especially the acute form, is quite rare when compared with the thousands of such pellagrins encountered in the South. These dietetic cases result from an unbalanced diet, especially lack of meat, milk and fresh vegetables. The post-alcoholics are not uncommon. Sweitzer³ reports 55 cases. They all gave a history of chronic alcoholism, their pellagra usually being precipitated by a prolonged debauch during which they ate very little. Among the secondary pellagras, we have largely lesions which produce a dysfunction of the gastro-intestinal tract. Eusterman and O'Leary⁴ have reported a series following obstructive lesions, both benign and malignant, of the upper intestinal tract.

Much still remains to be learned about the etiology of pellagra, but the generally accepted opinion is that it is due to a deficient diet, an avitaminosis. Following

the work of Goldberger and associates⁵ in 1926, it appeared that a specific factor in the diet had been found. This was called the P-P factor or pellagra-preventative (now termed Vitamin G or B₂, the latter term being used by the English biochemists). At this time the dual nature of the old water-soluble Vitamin B was demonstrated. One part was shown to be thermolabile with growth promoting and antineuritic properties. The other part of Vitamin B was relatively stable and capable of preventing and curing pellagra-like symptoms in the rat. It was found that dried yeast and lean beef were especially rich in this antipellagic factor. Recently, more reluctance has been shown in accepting the lack of a single food factor as the producer of the complex clinical picture of pellagra. That Vitamin G deficiency is intimately associated with the production of pellagra seems quite certain, but it does not appear to be entirely responsible in the uncontrolled human case. There often appear to be contributing factors, best exemplified in the secondary pellagras, whose true rôle we do not know.

The following case of pellagra developed while the patient was under treatment for tuberculosis from which she subsequently died. Because of the presence of tuberculosis and also diabetes the case cannot be classified as strictly a dietetic one. However, it is the dietary side of the case that makes it of interest.

CASE REPORT

The patient, white, female, aged sixty-eight, was admitted to Fairview Hospital December 11, 1931, because of chronic pulmonary tuberculosis with bilateral cavitation. The patient was not acutely ill but the prognosis was unfavorable. Past history was of no significance.

The patient was a small, high-strung, elderly lady, moderately emaciated. Chest findings were those of advanced tuberculosis. The motor system was normal.

Laboratory Data.—Sputum, positive for tubercle bacilli. Blood: Hb. 89; RBC 4,670,000; WBC 13,100. Urine: sugar 4+; albumin, trace. Blood sugar 400 mg.

The patient was placed on bed rest régime, given insulin (18 units) and diabetic diet (C 154, P 70, F 182). She was a strict orthodox Jewess and would

*From the Glen Lake Sanatorium, Oak Terrace, Minnesota.

touch nothing but kosher meat. Her relatives brought her kosher food occasionally. Her appetite was fair, but it had always been rather finicky.

About a year and a half later (April 5, 1933), the patient was transferred to Glen Lake Sanatorium. Her pulmonary condition had been running the typical slug-

eaten we found that the patient had been consuming a fairly well balanced diet except for a definite deficiency in animal protein.

There were two possible contributing factors aside from the diet, namely, tuberculosis and diabetes. It has long been observed that patients suffering from

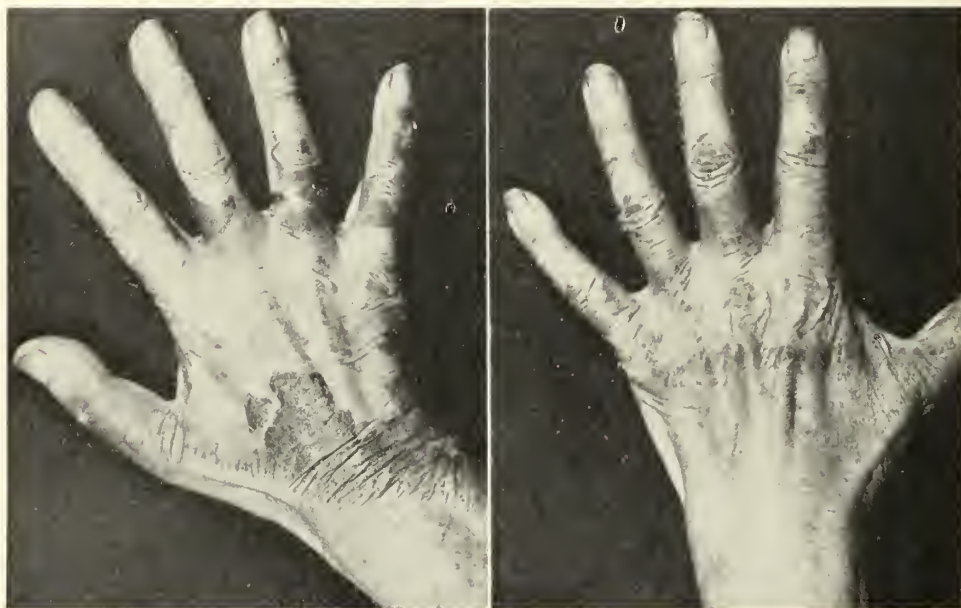


Fig. 1. Pellagra. Appearance of lesions six weeks after onset.

gish but slowly downward course of the aged consumptive; her glycosuria and hyperglycemia, however, had disappeared. Insulin was stopped. A diabetic diet (C 132, P 70, F 120) was maintained for a month and then discontinued. She was allowed bathroom privileges.

Her relatives came out infrequently now. This meant no kosher food, and as a result she was eating very little meat. We did not show immediate concern about this, because she was getting milk three times a day, eggs three times a week, and fish and chicken occasionally.

But, two months after admission, she began to develop the typical skin manifestations of pellagra on the dorsum of the hands. The tongue showed an atrophic glossitis, but was not sore. She had no gastrointestinal symptoms except that her stools at times were softer than normal. Neurological examination revealed some evidence of posterolateral degeneration. Both patellar reflexes were absent, the lower extremities were quite weak, and there were areas of parathesia over the arms and hands. Mentally, the patient appeared very anxious about herself.

Laboratory findings at this time: Blood: Hb. 79; r.b.c. 4,790,000; w.b.c. 17,000; p.m.n. 78; lympho. 18; l. mono. 2.5; e.o.s. 1.5. The red cells were normal in appearance. Urine negative. Gastric expression with histamine showed absence of free HCl.

With the appearance of the gauntlet dermatitis we arranged to get kosher meat daily. The value of lean beef was stressed. Yeast and dilute HCl were given. Improvement followed. The skin lesions exfoliated and cleared up in a few weeks, leaving the underlying areas thin and dry. Mentally she became less apprehensive and more cheerful. Her achlorhydria persisted. The neurological findings remained practically the same.

About three months later (October 24, 1933) the patient died from massive pulmonary hemorrhage. Autopsy permission was not granted.

On carefully checking back over the food actually

diseases which disturb metabolism are especially prone to pellagra. Pulmonary tuberculosis is frequently associated with pellagra, especially in regions where pellagra is endemic. The diabetes in this instance was probably only an incidental finding.

Deficiency diseases following adherence to certain religious beliefs regarding diet have often been observed. Night blindness occurring among orthodox Russians during lenten fasts was described in 1887. Knickknack eaters or individuals with peculiar phobias regarding foods are apt to develop pellagra. Carley tells of pellagra in a woman who feared certain foods would cause cancer. Her diet in time became reduced to cooked cereals. I could find no report in the recent literature of a case similar to the one described above.

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CASE OF PILONIDAL SINUS IN A NEGRO

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JAMES K. ANDERSON, M.D.
Minneapolis

This case is of interest due to the fact that to date there has not been a single case of pilonidal sinus reported in the negro race. G. W. Horsley, Richmond, Virginia, in reporting a series of cases, calls particular

attention to this fact. The case in question was that of a young negro girl fifteen years old who was admitted to the Minneapolis General Hospital, June 6, 1933, complaining of an abscess above the rectum, with pain on walking or sitting down. She gave a history of having had a similar swelling and soreness in the fold between the buttocks five months previously, which had spontaneously ruptured on two or three occasions, drained for some days, then apparently closed.

Examination revealed a moderate swelling 4 cm. in diameter over the sacrococcygeal articulation, somewhat to the left of the midline. Diagnosis: Pilonidal sinus, infected. June 7, 1933, under infiltration anesthesia the abscess was incised with the escape of about 2 ounces of foul pus. The inflammatory area was then excised by a wide margin and the wound allowed to heal by granulation. The tissue section did not show any cyst wall but much inflammatory proliferation. One small bit of isolated squamous epithelium was found at the bottom of the abscess cavity. Owing to the length of time which the inflammatory process had existed, I think it is to be expected that any cyst lining would have been destroyed and also any hair that might have been present.

In going over our series of pilonidal sinuses, now numbering ninety, of which sixty-four have had radical block excision (twenty cases reported in 1930) this is the first case in a negro. Supplementing our report in 1930, we still feel that this lesion, etiologically, is a fetal defect involving only the epithelial covering with a subsequent infection causing an inflammatory reaction which is the usual cause of a visit to the surgeon. We feel that a pilonidal sinus is an unfolding of skin to a greater or lesser extent, the minimum being in cases which present merely a post anal dimple, the more extensive cases resulting in skin lined sinuses an inch or two long. It certainly originates from the skin although the skin lining the tract is not always typical. In many cases, however, the hair follicles continue to function, resulting in the presence of numerous long hairs.

This additional series of forty-four cases which we are now reporting as having been operated since 1930, still give a history of having been operated one or more times previously due to lack of removal of the basic disease. There were twenty-five males (57 per cent) and nineteen females (43 per cent) including one negro.

At the present time there is an admixture of white blood in many of our negroes. Judging from her color, this patient probably had a mixture of one-eighth of white blood. It is an interesting speculation as to whether pilonidal sinus ever occurs in a person of pure African descent. The fact that this condition may not exist, or at least very infrequently, in the African strain, may possibly be of some interest to the anthropologists.

FOREIGN BODIES IN THE URINARY BLADDER

G. O. FORTNEY, M.D.
Zumbrot, Minnesota

It is interesting to note the variety of foreign bodies that have been found in the urinary bladder. Bransford speaks of calculi, pieces of suture, broken catheters or bougies, parts of a lead or slate pencil, toothpicks, crochet needles, straws, glass tubing, beads, wax, chewing gum, and hair pins. Kelly mentions foreign bodies entering through the peritoneal covering of the bladder from the tubes or ovaries, as well as from the vagina. Echinococcic cysts have ruptured into its cav-

ity; dermoid cysts have discharged large quantities of hair into the bladder cavity; pessaries, left in the vagina, have set up an ulceration and worked their way through the vesico-vaginal wall into the bladder; silk ligatures about the pedicles of ovarian tumors, having set up an inflammation and consequent suppuration, have been known to find their way into the bladder cavity. Haggard found the full skeleton of an ectopic fetus that had ulcerated its way through the wall of the bladder. Dunn found a bone sequestrum nearly an inch long. These examples may be classed as accidental.

The most usual foreign body intentionally introduced into the urethra and thence entering the bladder is the hair pin used by masturbators. It is thought that under the influence of sexual excitement or orgasm, the foreign body, used in this way, escapes the grasp and is forced into the bladder. Women and young girls will use some foreign body, usually a soft rubber catheter, to bring about a miscarriage. In such cases, either through ignorance or accident, the catheter is sometimes forced into the bladder.

Usually the foreign body produces no symptoms for an hour or two, after which signs and symptoms of vesical irritation commence. There may be a pressing down feeling in the bladder, obstruction to the flow of urine, or a suprapubic pain. The urine soon becomes cloudy and later contains pus and blood.

The prognosis is favorable if the foreign body is removed early but, if allowed to remain in the bladder, severe septic inflammation with peritonitis is very apt to develop, and the prognosis becomes grave.

Determining the presence of a foreign body in the bladder should be comparatively easy from the history. A bimanual examination may suffice or a distention of the bladder with air, with the patient in the knee-chest position, may facilitate palpation of the foreign body.

The treatment calls for speedy removal of the foreign body either through the urethra, through an incision made in the bladder wall through the vagina, or through a suprapubic incision. The method employed depends upon the kind, size, and shape of the foreign body to be removed.

CASE REPORT

On June 25, 1933, a girl twenty years old, well developed, strong, and perfectly healthy, came to my office in a very excited frame of mind and said that she had "passed something up in herself and had lost it." She appeared impressed with shame, was very slow in answering questions, talked very little, and would not tell me just what had happened. I could not understand what the patient was trying to tell me, nor what had happened to her.

It very soon occurred to me that the girl, being pregnant, had used a rubber catheter to bring about a miscarriage, but examination did not reveal any foreign body in the vagina. Speculum examination showed the cervix normal and no sign of injury, so it was decided that the catheter was not in the uterus. The patient insisted that the catheter was "still in her," but where she would not say. After making a rectal examination and not finding it, and while I was talking with her she complained of a bearing down feeling in the bladder and a desire to urinate. This led me to think that the foreign body might be in the bladder. An x-ray was taken and the skiagraph clearly showed the catheter in the bladder.

The patient was taken to the Colonial Hospital at Rochester, Minnesota, and Dr. R. G. Scherer removed the rubber catheter through the urethra with an operative cystoscope and appropriate accessory instruments. She was allowed to leave the hospital that same night and made an uneventful recovery.

PRESIDENT'S LETTER

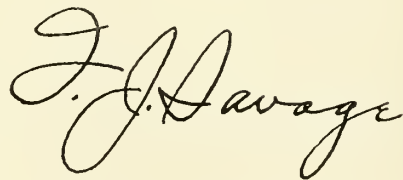
THE WOMAN'S AUXILIARY

FOR eleven years the Woman's Auxiliary of Minnesota has been doing splendid work along social, philanthropic and public health educational lines. I well recall in 1923 the president of the Ramsey County Auxiliary calling on me with reference to our first basic science bill. She expressed the willingness of the Auxiliary to help in any possible way. This same spirit has always been a characteristic of the Auxiliary all over the country. Their philanthropic activities cover a large field, governed chiefly by the needs of the various communities in which they live.

I can foresee in the future even greater effort in public health education among women and the promotion of an immunization program among children of school and pre-school age, against diphtheria and smallpox. Minnesota had twenty-six deaths from diphtheria in 1933. This is twenty-six too many. Children are coming into the world so fast that this campaign must continue indefinitely. Among our counties with the largest population, St. Louis County has the distinction of having had no diphtheria cases reported during 1933.

It is a startling fact that although tuberculosis has dropped from first to sixth place as a cause of death in Minnesota during the past thirty years, the incidence of tuberculosis among girls from sixteen to twenty-two years of age has shown no decrease. How much of this is due to dietary fads, insufficient clothing, too many cigarettes, and dances beginning at 10 P. M.? Who are better qualified to inaugurate a campaign of common sense among our high school girls than the members of the Woman's Auxiliary? How effectively this could be done in the smaller communities by the women giving an afternoon tea and asking a local doctor to talk to the girls!

When one considers the fact that cancer as a cause of death has jumped from sixth place in 1900 to second place in 1930, not only in Minnesota but in the country as a whole, one is forced to the conclusion that every available educational measure should be used. Contact with other women's clubs may be effected through the Woman's Auxiliary. The curability of cancer, provided it is recognized early, should be emphasized in these meetings. If desired, cancer films and speakers may be obtained through our secretary, Dr. E. A. Meyerding. I would like to see every branch of the Auxiliary sponsor a public cancer meeting in its own community.



President,
Minnesota State Medical Association.

EDITORIAL

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DR. ARNOLD SCHWYZER FETED

How much more gratifying it is to pay tribute to an outstanding medical confrère while he is present in the flesh, rather than to wait until he is gone. As it was so aptly put by one of the speakers at the dinner tendered Dr. Arnold Schwyzer by the Sisters of St. Joseph's Hospital on Lincoln's birthday last month, "an ounce of taffy is worth a pound of epitaphy."

Just forty-two years ago in February Dr. Arnold Schwyzer came to Saint Paul from Switzerland. His thorough training in the fundamentals of medical science gave him a broad foundation upon which to build through further study

and experience. As a result of his industry and natural ability Dr. Schwyzer has become an outstanding figure in medical circles. His professional career has been closely linked with the growth and development of St. Joseph's Hospital, for he has worked continuously at this hospital since 1892, except for regular summer vacations, largely spent in study in his "sanctum sanctorum" on the shore of a small lake at his farm in northern Minnesota, and frequent trips to Europe.

Dr. Schwyzer has ever been generous in sharing the fruits of his study and wide experience with his fellow surgeons and especially with the younger men who, as interns or assistants, came in contact with him. This was freely attested at the banquet attended by some one hundred and fifty doctors, friends and members of the hospital staff. Addresses were made by Dr. C. C. Chatterton, chief of the hospital staff; Dr. Justus Ohage, Sr., veteran surgeon of Saint Paul; Dr. John L. Rothrock, Dr. William C. Carroll, Dr. Fred Schuldt and Dr. William J. Mayo, whose address (published in this issue of MINNESOTA MEDICINE) paid tribute to the guest of honor.

It is the wish of all of Dr. Schwyzer's many friends that he, hale and hearty, at seventy, will continue his outstanding surgical work for many years to come.

BONE MARROW FUNCTION

Agranulocytic angina, primary and secondary, is frequently enough diagnosed to furnish diagnosticians with a stimulating urge to better evaluate the needs and importance of the bone marrow. It may be assumed that no clinical elucidation that has little application either enters the general consciousness of doctors or long supplies an urge to wider understanding. A treatment even generally promising provides still greater incentive. Pentnucleotide has its critics,¹ but to Schultz² and to Jackson³ and his co-workers goes the credit of providing causative criteria and a treatment.

Recently unusual zest has developed because of the incrimination in etiology of "Benzene^{4,5} chain derivatives . . . particularly those containing a barbiturate combined with amidopyrine." These types seem well established and with the polypharmaceutical flood drug houses are now providing rivaling the inundation featuring Noah, it is well to be on strict guard in interpreting

any doubtful throat accompanied by unusual prostration, anxiety, faucial pain and toxemia. A correct diagnosis can be easily made *before* the necrotic sloughs and contamination with Vincent's organism appear.

It is in that stage, of course, that withdrawal of baneful drugs and venturing such bone marrow stimulants (pentnucleotide, transfusions, liver, x-ray) as we have may rehabilitate what appears to be one of the body's chief weapons of defense: the granular leukocytes.

Incidentally, we see in these agranulocytic types a depression of neither the red cells nor the platelets. Primary red cell anemia is extraordinarily rare; overlapping leukemias and thrombocytopoenic purpuras less rare; pure granulopenias are fairly common. Thus we see clinical proof of the genetic individuality of these three primary bone marrow blood elements so essential to life and its physiologic adaptations. When all three are depressed we have the clinical entity of "aplastic anemia." Its picture⁶ is none too well defined and it is fortunately rare. It is only, however, by active interest in these rarities rather than passive therapeutic inertia that we shall come to appreciate the enormous potentialities in that treasure closet of the body—the bone marrow.

E. L. T.

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CHICAGO'S AMEBIC DYSENTERY

Certain definite lessons can be derived from the epidemic of amebic dysentery which emanated from Chicago last summer and resulted in more than 700 known cases scattered in 206 cities throughout the United States.

The concentration of people in large hotels in our larger cities offers a splendid opportunity for the initiation of epidemics. Some of these "vertical towns" in our large cities are old structures,

have a perfect maze of plumbing, and, as was the case in Chicago, no plans of the plumbing are available.

That any hotel could be built with cross connections between water supply and sewage seems unbelievable. That such was the case in Chicago and actually exists in other public buildings seems to have been determined. The problem is one for the sanitary engineer. The possibility of a back flow through drain pipes as a result of heavy rainfall or heavy demands on the drain facilities of a hotel is also in the province of the sanitary engineer.

We can see no excuse for the negligence on the part of the hotel management in not protecting the food supply of the hotel in question, following the inundation of the basement on two occasions last summer with drain contents resulting from heavy rainfall. This was gross carelessness and when such an unforeseen accident occurs the hotel management is responsible for handling such a dangerous situation.

The Illinois Medical Society seems to feel that Dr. Bundesen, Chicago's Health Commissioner, was guilty of poor public health policy in not notifying the local medical profession of the existence of an unusual type of epidemic before he did. There is doubtless a widespread feeling of resentment on the part of members of the profession (to say nothing of certain individuals) throughout the United States, that the profession in general was not taken into the confidence of the Chicago Health Department long before it was. After all a health department makes a mistake in attempting to control an epidemic without frank publicity and invoking the aid of the medical profession.

TWIN CITY SEWAGE DISPOSAL PLANT

The local medical profession is distinctly interested in large industrial or engineering projects, involving as they do nowadays medical and surgical work. So it is with the construction of the proposed Twin City sewage disposal plant.

Involving the expenditure of eighteen million dollars to be loaned by the federal government through the Public Works Administration, the project is to be carried out by a Board of Trustees of the Minneapolis and Saint Paul Sanitation District. Contracts for various parts of the work are to be let to the lowest bidder.

For some reason or other the Board of Trustees made the proposal that the employers' liability insurance for all the contractors be let to one insurance company and that one surgeon be employed to handle all the medical cases involved, except for certain first aid requirements. What particular advantage to the workmen there is in such a suggestion we fail to see. Economy may have been the object. On the other hand such a

procedure is likely to result in the employment of a second rate surgeon, one who is willing to devote his entire time to a job of this sort, of limited duration, at the sacrifice of his private practice.

As the money being spent is furnished by the federal government, Uncle Sam has something to say as to how the money is spent. The employment of one surgeon has been disapproved by the state engineer who is in the employ of the federal government and has supervision of all PWA work in the state. It is to be hoped that his disapproval will be sustained by the federal authorities and that medical care in connection with this huge project will be handled in the usual way, the contractors handling their insurance separately and the medical work thus being distributed to the local members of the profession.

The question will naturally arise as to the right of the individual workman to choose his own doctor. While the workman has such right in this state, it has been the practice of insurance companies to direct injured workmen to specified surgeons, the idea implied or specifically expressed being that the employe cannot choose his own surgeon. We can see some justice in the insistence of the insurance companies on selecting certain surgeons to do their work. Certain members of the profession are not above "sticking it on" when an insurance company is paying the bill and certain doctors are not qualified for such work. If the insurance companies allow a certain amount of leeway in the choice of a surgeon, as they do, this is probably the best procedure to follow.

AN APPRECIATION OF DR. ARNOLD SCHWYZER*

WILLIAM J. MAYO, M.D.
Rochester, Minnesota

I am always glad to come to Saint Paul.

My father came to the state in 1854, and Saint Paul was the early center of his activities. In my younger days, through him I became acquainted with many members of the Saint Paul medical profession, with whom he was intimate. I learned to know and to admire these men. I knew Charles A. Wheaton, who I believe was one of the most brilliant surgeons that our country has produced, and one of his associates was Archibald MacLaren, of beloved memory, a man of sound surgical judgment in whom we all had confidence, and also Parks Richie, master, teacher, and for a time dean of the Medical School.

Minnesota has always had a splendid medical profession, and was one of the first states to pass medical laws, which, while they did not keep out the irregular practitioners and the outright quacks and mountebanks, did at least maintain a high standard for the members of the regular medical profession. We were fortunate

also that there came into the state in the early days a number of men who had received their medical training in Europe, and who accompanied, so to speak, the great immigration to Minnesota from the Scandinavian and Teutonic countries. These countries had led in the scientific application of the new philosophies in medicine, and the physicians they gave to America brought with them not only a learning which we did not possess in comparable degree, but a willingness, nay, even a desire, to extend this new knowledge to other members of the medical profession.

Among others was Dr. Justus Ohage, an educated man from Germany, who came to Saint Paul in 1881, bringing knowledge of the newer developments in surgery. It is very interesting to know that Dr. Ohage was the first in this country to plan and carry out the operation of cholecystectomy, in St. Joseph's Hospital, Saint Paul, September 24, 1888.

Another great man was Dr. Eduard Boeckmann, born and educated in Norway, who came to Saint Paul in 1887. To Dr. Boeckmann we owe the first reliable steam sterilizer, and also a method of preparing pyoktatin-catgut for ligatures, which was the beginning of the absorbable suture in surgery. Dr. Boeckmann was the godfather of the splendid medical library of the Ramsey County Medical Society.

And there was Dr. Gottfried Stamm. Born in Switzerland, he came to Saint Paul in 1873, and lived there thirty-four years, until his death. He was a fine man and citizen, a most able and scientific physician and surgeon, free from professional jealousy. On one occasion he went out of his way to ask me, a very young man, to see a former patient in consultation, so that I should not be humiliated by a mistake which I had made in diagnosis.

Drs. Arnold and Gustave Schwyzer, born and educated in Switzerland, joined this illustrious group of profound scholars and teachers in 1891.

American surgeons, brilliant, and well trained though they were in anatomy through the Scottish masters and in the gross pathology of the "dead-house" of the English tradition, were not as yet so versed in the *pathology of the living* as these men who had been educated in Europe.

Pasteur, a Frenchman, did more for the human race than any other man who ever lived, but French surgeons, while they accomplished much in the middle of the last century for fine anatomical dissections, had not fully accepted the relationship to disease as brought out by Pasteur's discoveries just as the medical profession of Great Britain failed to grasp what Lister's discoveries meant to medicine and to surgery. It was in the Teutonic and Scandinavian countries in the middle of Europe that the contributions of Pasteur and Lister received great attention. The cities of Austria, of Germany, and of the Scandinavian countries were developing universities where the scientific knowledge which we had missed in our own development was brought forward. Virchow had developed his theory of cellular pathology, Koch and his fellow workers elucidated bacteriology in connection with tuberculosis and infections. Switzerland, a mighty country, yet of less than five million people, from the fourteenth century had maintained a liberal form of government and developed a unity of purpose in spite of the four languages, Swiss, German, French, and Italian, spoken within its borders by the people who composed the population, and was an example to the world in political integrity and scientific endeavor.

My brother and I, attending the clinics of Christian Fenger, in Chicago, who had received his scientific medical training in Denmark, there met Murphy, Ochsenner, Senn and a host of others who also were thus gaining insight into the medical progress that had taken place in northern Europe.

In New York City at this time, Dr. Arpad Geza Charles Gerster, who was born in Hungary of Swiss

*Remarks at dinner in honor of Dr. Arnold Schwyzer, Monday evening, February 12, 1934, at St. Joseph's Hospital, Saint Paul, Minn.

parents, was conducting clinics of the same type as Fenger, engaged in the great task of teaching the new surgery to the American medical profession. Gerster, with his book, "The Rules of Aseptic and Antiseptic Surgery," published in 1888, did more to advance us in that knowledge which we lacked than any other man of his time.

As I look back on this period in American surgery, I recall brilliant men whose names are familiar to the older of you: in Boston, Maurice Richardson, Cheever, the Cabots, Warrens, Francis Watson, and many others; in New York, Robert Weir, Charles McBurney, William T. Bull. In Philadelphia was that great triumvirate, the Grosses, father and son, and David Hayes Agnew. And so one could go over the country, recounting great surgeons, trained anatomists, dead-house pathologists, but all at that time lacking in that essential thing which was brought in by Pasteur and Lister.

It was fortunate that my brother and I thus at an early time learned that the men who had received fine training in foreign countries and who were acting as our leaders in America had come from certain sections of Europe. In the middle nineties we, with numbers of other students of medicine, began going over to Europe each year to see and learn. We saw that what we had in America was the art of surgery based on the science of anatomy and dead-house pathology, but that we lacked the *living pathology* which was the foundation on which surgery must achieve its purpose.

On my second trip to Europe, in the late nineties, I went for the first time to see Kocher at Berne, Switzerland. Kocher was the great surgeon of his time. He inspired other men to advance the superstructure on the foundations which were being erected.

On my first visit, Kocher asked me where I was from. I told him Minnesota. He thought for a moment and said,

"Arnold and Gustave Schwyzer are living in Minnesota. Have you ever met them?"

I said that I had not and asked if they had been in Minnesota long.

"Yes, a few years. They are good men."

I remember thinking at the time that men who had had the opportunity of working as assistants in Kocher's clinic for a number of years certainly had a rich heritage to bring into a country which needed highly trained men as much as we did.

You may rest assured that when I came home I made a business of meeting the Schwyzers. There grew up between them and my brother and myself, friendship. We did not meet often, but we found them helpful, modest, aiding by example even more than by precept. I can remember many friendly things that Arnold Schwyzer has done for me that have aided in clearing confused thought, especially in foreign literature with which I was not so familiar. I did not get my German until high school and college; I should have had it when I was a child, as the Swiss do. I could read French, but slowly. Consequently when I was in Europe, I always felt and acted and spoke like a foreigner. Languages should be taught to our students when they are young.

In those early days I was very much interested, as I always have been, in carcinoma of the stomach, and in the nineties I did some planned resections, for carcinoma of the stomach, following the Billroth II method. There was very little known about the lymphatics at that time, however, and from the dead-house and anatomical studies and what I could learn from the literature, I had written a paper, of which I was proud, on the lymphatic supply of the stomach in relation to cancer. Arnold Schwyzer made us one of his visits at about that time and I remember so well showing him my paper. He read it and paid me some kind compliments. I asked him if he knew of anything that had been written on the subject, for I had been unable to find anything of particular value. He said that a

short time previously a young Frenchman had presented a thesis on this very subject before the University of Paris, and he was kind enough to send me a copy. I found that this young man had done the work I had done but very much more work and very much better. It was most illuminating and helpful.

I speak of this incident because of the friendly way in which Dr. Schwyzer helped me, and because it illustrated two things: Dr. Schwyzer's desire to aid one who was making an attempt to progress in surgery, and second, the kindness with which he accomplished his purpose. Dr. Schwyzer's friendly relationships, his desire to encourage progress, not only of the profession as a whole but of individuals in the profession, have established for him a leadership in surgery in the state.

It would be idle for me to speak to you who know him so well of the many contributions he has made to surgery, and by example illustrating the difference between the surgeon and the operator. Surgery is more a matter of mental grasp than it is of handicraftsmanship. I think all of us who have worked years in the profession understand that many very skillful operators are not good surgeons.

Dr. Schwyzer has always approached his surgical discussions from the standpoint of the science of surgery as well as the art, revealing that early fundamental training which stimulated his thought along the lines of the causes and development of disease conditions, to advance along sound lines of prevention and cure. As Professor of Clinical Surgery at the University of Minnesota, Dr. Schwyzer encouraged the students to think, not merely to remember, and all those who attended his clinics were profoundly influenced in their future careers.

The merit of the quiet, modest man whom we honor tonight has been recognized by the profession to a greater extent than he perhaps has realized. I think Dr. Schwyzer, when his name came up before the American Surgical Association, was surprised, and I hope pleased, to know that he was one of the few men to have the honor and distinction of being taken into the Association by unanimous vote on the first ballot.

It was with great pleasure that I accepted the invitation to meet with you tonight to pay tribute to Dr. Schwyzer, to tell him how much he has aided the profession in Minnesota in developing their surgical understanding, to thank him for his kindly and friendly coöperation with his colleagues and for the sympathetic manner in which he has protected us in our mistakes and prevented us from being subjected to criticism.

In joining with you in honoring our colleague on this occasion, I have taken advantage of the opportunity to express the appreciation that American surgeons feel for the aid given by the highly educated, wise men, among whom none is more esteemed than Arnold Schwyzer, who came into this country in the eighties and nineties and enabled us to gain a new viewpoint of surgical science. I am personally grateful to Dr. Schwyzer for the help I have received so generously and so whole-heartedly.

ANTUITRIN S

"Antuitrin S"—Parke, Davis & Co., is said to contain the "prolan" principle of Aschheim and Zondek, obtained from the urine of pregnant women. The published evidence indicates that prolan is of value only in certain cases of functional uterine hemorrhage. THE JOURNAL does not know of any evidence that it may relieve hemorrhage due to uterine tumors of any sort, whether benign or malignant. Antuitrin does not stand accepted by the Council on Pharmacy and Chemistry. (Jour. A. M. A., November 4, 1933, p. 1503.)

OF GENERAL INTEREST

Dr. Walter P. Gardner has announced the opening of his new office for the practice of neurology and psychiatry at 1054 Lowry Medical Arts Building, Saint Paul, Minn.

Requests for physicians have been received from two cities in Minnesota. Anyone who is interested will please communicate with the Minnesota State Medical Association, 11 W. Summit Ave., Saint Paul.

Dr. Arnold Jackson of Madison, Wisconsin, is making a survey of the incidence of cretinism in the United States and requests physicians who have records of such cases to furnish him with the essential data of the case including name (to avoid duplication), address, nativity, age, sex, physical characteristics (in brief), clinical history (in brief), presence or absence of goiter, mental status, results of medication. Photographs are especially desired. No one has as yet made such a survey and the data will be turned over to the American Medical Association for reference and study.

An additional \$500,000 has been given the University of Minnesota for use in connection with the activities of The Mayo Foundation by the Mayo brothers. In a letter from Dr. William Mayo to the Board of Regents of the University received February 16, 1934, Dr. Mayo outlined his idea of devoting some of the funds received by The Mayo Clinic from the sick to the establishment of a permanent Foundation for medical education and research to the ultimate benefit of the sick. In 1915 a million and a half dollar endowment, under the title of The Mayo Foundation, was given the University with the stipulation that the fund should be allowed to accumulate to two million before it should be used. The temporary arrangement was made permanent in 1917.

In 1919 the Mayo Properties Association, a charitable corporation without capital stock, holding title to all the lands, buildings, laboratories and equipment of all kinds used in Rochester in the work of the Foundation, was created. This association has had the same purpose as the Foundation and this additional gift constitutes a transfer of \$500,000 from the Mayo Properties Association to add to the endowment of The Mayo Foundation. The gift has been gratefully accepted by the University.

OBITUARY

Dr. Cyrus Bowers Eby
1872-1934

Cyrus Bowers Eby was born December 9, 1872, at Sebringville, Ontario, where his father was a practising physician. His early education was obtained in the Sebringville schools and at the Collegiate Institute at Stratford, Ontario. In 1889 he and his brother Robert entered the University of Minnesota, where he graduated in Medicine, with honors, in 1892.

After graduating, Doctor Eby obtained a position as physician at the Rochester, Minnesota, State Hospital, later becoming Assistant Superintendent at this institution. After leaving the Rochester State Hospital he spent about a year in practice in the mining town of Mountain Iron, Minnesota.

While living in Rochester he was married to Miss Blanche Bamber, of that city, in July, 1896.

After leaving Mountain Iron in 1903, Doctor Eby located at Spring Valley, Minnesota, where he continued to live and work until the time of his death.

The story of Doctor Eby's life reminds one of the famous stories of country doctors in fiction and film. Plain and unassuming, he was devoted to his work, his home and his simple recreations, which he had chiefly in fishing and outdoor life, and in his beloved garden. His greatest hobby, however, was his work, and he is chiefly remembered because of his devotion to needy people and for his love of children.

His funeral day was like a sabbath day, as the business places were all closed in his honor. Crowds of people from every walk of life filled and overflowed the large Methodist church where the funeral services were held.

The stories one heard about him were all the same: that he was looked upon as a friend, and that many people consulted him about business and personal matters as well as for illness. Many people said, "His place cannot be filled."

Even the end came in the simple, heroic way that was in keeping with his life, through devotion to his work. Although he was not well he answered a call some ten miles in the country. The road was blocked with snow, and he had to shovel and apply chains to get through. A chain was lost and he tried to fasten a rope about the wheel. After a great deal of exertion he reached his destination. Sitting beside his patient's bed he remarked that he had a little heart trouble and then fell forward, in death.

Words cannot add to the nobility of Doctor Eby's life and its passing. Most doctors would envy the way of his life and its ending.

Surviving Doctor Eby are his wife Blanch, and his son Robert, and his daughter Esther, two brothers, Doctor Robert Eby of Elko, Nevada, and Frederick of Austin, Texas, and two sisters, Dorothy and Grace of Trenton, New York.

Doctor Eby was a member of the Olmsted-Houston-Fillmore-Dodge County Medical Society, Houston-Fillmore Medical Club, the Southern Minnesota Medical Association, the Minnesota State Medical Society and the American Medical Association.

J. E. CREWE, M.D.

Dr. Fred N. Hunt
1857-1934

Dr. Fred N. Hunt, for fifty years engaged in the practice of medicine in Fairmont and Blue Earth, passed away at his home in Fairmont on January 31, 1934.

Fred N. Hunt was born on September 30, 1857, in Sterling County, Illinois. He was the son of Reverend Nehemiah Hunt, a circuit riding minister whose abolitionist activities resulted in his being driven from his home community. The Hunt family moved to Lura Township, Blue Earth County, in 1864.

After three years at Carleton College, Dr. Hunt returned to Fairmont in 1879 as teacher in the higher department of the village school.

In 1882 Dr. Hunt was married to Miss Ida Cadwell, the ceremony being performed by the bridegroom's father.

Graduating in 1883 from the Missouri Medical College, Dr. Hunt began practice the same year in Fairmont. In 1892 he moved to Blue Earth, where he practiced for twenty-one years, returning to Fairmont in 1914. In partnership with his son, Dr. Roscoe Hunt, he established the first hospital in Fairmont.

Always interested in the town of Fairmont, Dr. Hunt contributed largely to its development and was ever a leader in community activities. His friends knew him

as a cultured and most companionable gentleman, as well as a successful physician.

In spite of his years, Dr. Hunt was active in practice until about two weeks before his death, when he fell on the step of his home, sustaining injuries from which he did not recover. Mrs. Hunt and two sons, Dr. Roscoe Hunt of Fairmont and Rollo Hunt, an attorney residing in Duluth, survive.

A WOMAN PIONEER IN A NEW PROFESSION, MEDICAL EDITING

With the passing of the editor of the publications of The Mayo Clinic it is fitting that some record here be made of the events of her life relating to her professional career. Genius is inexplicable but contributing factors are worthy of study. Childhood on a pioneer farm, meager country and village schooling, and a two-year nurses' training course at best are only negative in their implication of the literary ability developed by this great editor. What then were the traits of character which, shaped by her personal contacts, made her what she was?

Annie Maud Headline was born near Faribault, Minnesota, of unusually intelligent Swedish parents. She was the youngest of seven children. Her father, whom she closely resembled physically and mentally, was noted for his fine mind and strong character. Her mother was of a happy disposition, an unrelenting worker, and meticulously orderly in all her ways.

Annie's early schooling was obtained in brief terms in one-room country schools situated respectively one and three and a half miles away, and in two terms in a small village "Academy." Of her personal reading there remain records of her having read Charles Kingsley's "Greek Heroes," many of Scott's, Dickens', Thackeray's, Poe's and W. D. Howell's novels, Oliver Wendell Holmes' "Autocrat" series, and Shakespeare, before she was eighteen years of age.

As the girl grew up her aspirations did not turn to teaching, the occupation of both her sisters, but toward medicine. Without sufficient money to support herself in medical school, on the advice of her sister's physician, in 1885 she entered the training school for nurses of the Presbyterian Hospital in Chicago "because the hospital opened into Rush Medical College."

As a student nurse Miss Headline was the leader of her class. In addition she attended all lectures she possibly could find time for in Rush Medical College. Her text-books, still preserved, include in addition to those used in the nurses' course, the standard works on anatomy, physiology, and chemistry then recommended for the use of students in Rush Medical College. She was a star student in anatomy under the tutelage of Charles T. Parks. Though she was never permitted to dissect, her texts include a good colored atlas of anatomy. She was not officially enrolled as a medical student but Moses Gunn, Norman Bridge, Charles T. Parks, Walter S. Haines, J. H. Etheridge and other members of the faculty of Rush Medical College and teachers in the Nurses' Training School aided and abetted her in her unofficial study of medicine. The middle eighties was a golden age in the faculty at Rush. The friendships and inspirations of the men mentioned were marked factors in the development of Miss Headline's keen mind. Perhaps most influential of these was that master teacher, Moses Gunn, whose personal inspiration was so great a factor in the lives of such men as Charles T. Parks, J. B. Murphy, A. J. Ochsner and other surgeons. It was equally a factor in the professional life of Annie Maud Headline, who was his favorite nurse for more than two years and who nursed him through his last illness.

After graduating in nursing May 10, 1887, Miss

Headline did private nursing in and out of the Presbyterian Hospital until September of the same year, when she became "matron" (superintendent) of the Maurice Porter Memorial Hospital for Children in Chicago. While this gave her a better income it interfered with her further study of medicine. This study was finally definitely terminated when on September 28, 1889, she married Dr. Ernest J. Mellish.

Dr. Mellish's diary, covering the period from 1879 to 1897, records his graduation from Rush in 1886 and three years' hospital training, the first two of which were in the Presbyterian Hospital and the last in Cook County Hospital. He was a young surgeon of great promise but tuberculosis, which had manifested itself before his marriage, drove him out of Chicago to Ishpeming, Michigan, where he remained three years, returning to Chicago in December, 1892. Here on May 10, 1893, at her husband's request Mrs. Mellish dropped the name "Annie" and became "Maud" to her later friends.

In the depression in the years immediately following the World's Fair the young couple had a desperate struggle for a livelihood and for Dr. Mellish's life, though he was doing much work in charity hospitals and devoting much time as an instructor in Rush Medical College. He took an active part in medical societies and, encouraged by his wife, wrote a considerable number of medical articles. In March, 1896, his diary says, "Maud is of inestimable aid to me in revising my papers. I am sure they are much more readable for the revision. There are no superfluous words left in them."

During a partial quiescence of his disease from 1897 to 1901 Dr. Mellish's surgical practice grew to be quite successful. A recurrence of his symptoms in 1901 forced him, accompanied by his wife, to migrate to El Paso, Texas, where for a time he partially recovered and built up a considerable surgical practice. He died in El Paso April 23, 1905.

There is no doubt that during the sixteen years of her early married life Mrs. Mellish, despite worry over sickness and financial stringency, much occupied herself with reading and criticizing medical literature in connection with the work of her husband and that of Dr. A. J. Ochsner. After her husband's death, when she was forty-three years of age, she realized that she could more readily make headway in a field related to medicine, but not requiring the further formal professional schooling which would be necessary for medical practice. She spent the next two years in Chicago arranging a library for Augustana Hospital, many of the books in which she had loaned to the institution. In the same time she was doing editorial work for Dr. A. J. Ochsner. Her chief editorial work during this period was on the large volume on "Hospital Construction" by Dr. Ochsner and Architect Sturm.

In the meantime in the organization which was to become The Mayo Clinic the increase in the number and length of services of interns and residents had rendered very pressing the need of a library other than the private libraries of the members of the staff. Dr. William J. Mayo appealed to his friend Dr. Ochsner to suggest someone to develop a library. Dr. Ochsner recommended Mrs. Mellish. On March 1, 1907, she was taken on the staff "to organize and develop a library and to do editorial work in connection with the publication of papers."

The library at that time consisted of the books in three small cases and the journals on a small reading table. It rapidly grew, however, until in 1909 a small library building, which was joined to the offices by a corridor, was erected to house it. Within three years this building was outgrown. Consideration of enlarging it in 1912 led finally to the decision to provide ample room for a library in a general clinic building. In 1914 the Division of Publications was organized with an

editorial section, a library section, and an art studio. Mrs. Mellish was made director of the Division and head of the editorial section. A trained librarian was placed in charge of the library and Mrs. Mellish thereafter devoted most of her time to editorial work.

In 1924 Mrs. Mellish married Dr. Louis B. Wilson, head of the Division of Laboratories of The Mayo Clinic and Director of The Mayo Foundation. The two had been intimately associated since 1907 through the many contacts of their respective departments and in planning the library arrangements in both new buildings.

The volume of work accomplished by Mrs. Wilson with the aid of always loyal though always too few assistants was stupendous. Any numerical expression of the volume of this work is inadequate, for such expression gives no picture of those aspects of the task which were not in evidence but which took much time and energy. Nevertheless, in the "Collected Papers," under the various titles which the volumes bore from 1905 to 1933, inclusive, are recorded nearly 6,000 papers. From 1921 to 1933, eleven volumes of the Surgical Clinics of North America and twelve volumes of the Medical Clinics of North America were contributed by The Mayo Clinic. Two volumes of the early papers of Drs. W. J. Mayo and C. H. Mayo passed under the scrutiny of Mrs. Wilson, eight Mayo Clinic Monographs, four volumes of Mayo Foundation Lectures, one volume of Beaumont Foundation Lectures, two volumes of The Physicians of The Mayo Clinic and The Mayo Foundation, two volumes of papers from The Mayo Foundation and the Medical School of the University of Minnesota, the annual Transactions of the Association of Resident and Ex-Resident Physicians of The Mayo Clinic and The Mayo Foundation from 1919 to 1932, and five other books, two of which are large works. In 1926 began one of the most arduous activities of the Division of Publications, namely, weekly publication of the Proceedings of the Staff Meetings of The Mayo Clinic. Organizing this activity and subsequent editing of the material and supervision of the publication and distribution fell to the lot of Mrs. Wilson.

Scarcely any article or book during this entire period was published without a detailed criticism and editing by the chief editor, a task to which she sacrificed all other interests. Many of the articles coming to the editorial department had to be recast by the editor in consultation with the author. In all her work she always strove to preserve not only the facts but the author's individuality as well.

Most medical editors of fifteen years ago were doing editorial work incidental to their principal occupation in some form of medical practice. Their chief concern was in the general content of their journals. Mrs. Wilson's chief concern was in procuring the most correct and most understandable statement of the subject matter of each article. Hers was penetrating, scientific, literary criticism at a stage when it assisted rather than chagrined the author. Yet when she edited a book or a volume of "Collected Papers" she made of it a balanced unit, sometimes as much by elimination of irrelevant matter as by logical arrangement of that included. This is why "Collected Papers" has never been merely an accumulation of reprints but a coordinated annual report of the work of the institution from which it emanated.

It was through her individual relationship with the members of the professional staff of The Mayo Clinic and with the Fellows of the Mayo Foundation that this great woman most exercised her moulding influence on the intellectual life of the two institutions. Her clear thinking, her unbiased judgments, and her insistence on the truth and nothing but the truth, stated so that readers could understand it, made her influence on the physicians with whom she worked prodigious and inescapable. Though a woman of strong emotions

she utterly divorced these from her professional work. The interests of the individual author were always secondary to those of the institution. Always her first question was, "Is it true?" second, "Are its relations to other work in the Clinic and elsewhere fairly defined?" and third, "Is it worth publishing?" These questions settled, she proceeded to make the article clearer. Her intuition of scientific error was phenomenal despite the meagerness of her formal training in medical science. Her insistence on herself thoroughly understanding each article passing through her hands soon gave her a breadth and accuracy of medical knowledge not possessed by all physicians. Her adherence to what her judgment dictated regardless of consequences came from her utter fearlessness. Her skill in English came to some extent from much reading of good literature but to a much greater extent from her critical attitude toward every written phase. While an untiring student of reference books on English language and composition, her mind frequently leaped far ahead of these and accepted or rejected words, phrases, and constructions long before her judgments were backed up by broader usage.

As so frequently happens with great literary critics she did little original writing herself. A few papers, one small monograph on "The Writing of Medical Papers" (1922), now in its third edition, and joint authorship with Dr. Wilson of a brief "Historical Sketch of The Mayo Clinic and Mayo Foundation" (1926) constituted her original publications. Yet for a quarter of a century she made effective the medical thought of the men of The Mayo Clinic and The Mayo Foundation.

When an exploratory operation in October, 1932, disclosed widespread abdominal carcinomatosis she did not falter but, in the intervals between courses of roentgen treatments, kept actively engaged in editorial work in her office until six weeks before the end.

Thus we may perceive some of the factors of this pioneer's determination, self-sacrifice, and genius which enabled her to surmount seemingly impossible barriers and to become, as many competent judges have said, not only one of the greatest medical editors of her time, but also the most powerful influence in clarifying, coordinating, and orienting the scientific thought of more than a thousand men and women who have placed on paper the results of their professional work while connected with The Mayo Clinic and The Mayo Foundation during the last three decades. The record of her labors is graven on every page of their published work; her inspiration to truthfulness and fairness to others on every mind.

December 15, 1933.

LOUIS B. WILSON.

(From the Supplement to *Proceedings of the Staff Meetings of The Mayo Clinic*, December 20, 1933.)

AMPULES SODIUM CACODYLATE 7½ GRAINS
(0.5 GM.), 5 C.C. (FOR INTRAVENOUS USE)
AND AMPULES SODIUM CACODYLATE
15½ GRAINS (1.0 GM.), 10 C.C. FOR IN-
TRAVENOUS USE (CHEPLIN BIO-
LOGICAL LABORATORIES) NOT
ACCEPTABLE FOR N.N.R.

The Council on Pharmacy and Chemistry reports that the Cheplin Biological Laboratories presented these ampules of sodium cacodylate (among others) for consideration as to inclusion in New and Non-official Remedies. The Council holds that the desired effects of sodium cacodylate may be achieved by oral administration of the drug or, in exceptional cases, that the intramuscular route may be desirable. The Council therefore held these ampules of sodium cacodylate unacceptable for inclusion in New and Non-official Remedies. (*Jour. A. M. A.*, December 23, 1933, p. 2050.)

A FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

MEDICAL CARE DIMINISHES FOR CWA

Hospital Association Hires Lobby: Veterans "Unable to Pay"

When the CWA and the CWS were first set in motion, the government appeared to have undertaken to furnish certain types of medical care to millions of men and women.

Medical bodies hastened to confer with the authorities in charge. As a result, arrangements were early affected in most communities whereby CWA employees were to be taken care of by civilian physicians in civilian hospitals without the necessity for further elaboration of government medical services.

The probable scope of this medical care to CWA workers was overestimated, however, and many difficulties foreseen at the start have not materialized and will not materialize according to news brought back from Washington by C. B. Wright of Minneapolis, Trustee of the American Medical Association, and member of the Legislative Committee of the organization.

Says Dr. Wright: "The Government is not planning to provide medical care on a large scale for the temporary employees of its Civil Works Administration.

"This employment is being dropped as rapidly as possible. Millions are already off the rolls. Medical care for these people has amounted to very little more than first aid for minor injuries suffered in the course of their work. A comparatively small amount of the appropriation has been spent under the agreements reached between local administrators and local medical groups. The amount will grow steadily smaller.

"All proposals to give these employees physical examinations have been opposed by Washington from the start on sound grounds.

"To examine this army of men and women adequately would involve the government in a huge and wholly unjustified expenditure. To examine them cheaply and hastily would be worse than useless so far as protection goes for the government or for the worker.

"At the same time, claims for compensation on the part of the employees would be encouraged and facilitated. A physical examination which might easily pass over such grave chronic conditions as tuberculosis would then be on record.

"The government is strongly opposed to setting up any elaborate machinery for the care of these employees since it is hoped that their employment will terminate in May."

Among other matters of interest brought home from Washington is the news that the American Hospital Association now supports a lobby in Washington. This association has been very active in the politics that concern management and administration of hospitals in the last few years, such, for instance, as the recent tariff that affects the price of soap, a commodity of importance to hospitals.

* * *

The American Legion's "Four Point Program" for veterans of the World War, which was adopted last summer on the heels of the Economy Act of March

20, 1933, embraces an urgent plea for restoration of hospitalization for veterans to its former status.

Executive orders have gradually liberalized the restrictions of the act to a point where, with the Executive Order of January 19, 1933, and interpretations under which Regional Offices of the Veterans' Administration have been operating since early February, all beds in the hospitals have been occupied again and few obstacles are placed in the way of any sick veteran of ninety days' service who applies for care. The Legion hopes to erase most of the remaining obstacles.

Point two of the "Four Point Legion Program" embodied in the bill introduced by Senator Reed of Pennsylvania (who was violently opposed in the last Congress to the care of the non-service-connected disabilities) would make it obligatory on the part of the Veterans' Administration to hospitalize any man with a non-service-connected disability on the mere statement that he need hospitalization and was unable to pay for it. This would open up the hospitalization program on a greater scale than it was under "202-10," which provided that the Veterans' Administration might hospitalize needy veterans with non-service-connected disabilities if beds were available.

There is no question but that the last executive order made adequate provision for the care of the needy veterans with non-service-connected disabilities. It leaves with the Veterans' Administration the determination of the point as to whether the man really needs it or not, and the interpretation of the Veterans' Administration is that any single veteran who earns \$50 a month is not eligible for care of non-service-connected disabilities.

The hospitals are now instructed, according to their facilities, to care first for total and permanent war service disabilities; next for war service disabilities of less extensive character; next for chronic conditions such as tuberculosis; then for emergencies not connected with service; and finally, for all men injured in the line of duty for all their illnesses whether or not they are related to service. The Veterans' Administration is empowered to contract again for facilities for its patients in other government hospitals and, ultimately, if necessary, in civilian hospitals.

From W. J. Mayo on "The Value of the Medical Society to the Practitioner of Medicine" printed in the Proceedings of the Staff Meetings of the Mayo Clinic, January 17:

"I have never understood why so many men do not belong to their county and state medical societies. I have questioned such men sometimes. They usually say they do not find the societies of much value. But they do not help to make them valuable. They say they can get the same information from books and journals. But the individuals who seek isolation soon find that it is not necessary for them to take good journals and books. They begin to rely on cheap medical journals which advertise certain remedies which, it is hoped, will take the place of medical consultations. After a time, you will find that the dust gathers even on these journals unopened."

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MEDICAL BROADCAST FOR THE MONTH

The Minnesota State Medical Association Morning Health Service.

The Minnesota State Medical Association broadcasts weekly at 10:15 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M. D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of March will be as follows:

March 7—Heart Adaptations.

March 14—Scarlet Fever.

March 21—Anemia and Its Treatment.

March 28—Cancer of the Cervix.

ANNUAL MEETING

Several distinguished out-of-state speakers have already accepted invitations to appear before the 81st annual meeting of the Minnesota State Medical Association to be held in Duluth, July 16, 17 and 18.

Among them are Walter Bierring, Des Moines, president of the American Medical Association; A. B. Moore, Washington, D. C., and J. C. Towey, Powers, Michigan. Others who are expected to appear are John Fulton, Yale University; Max Cutler, Chicago, and P. T. Bohan, University of Kansas.

Program plans were practically completed at the February 15 meeting of the Committee on Scientific Assembly which met at the Lowry Hotel in Saint Paul. They call for special society meetings, similar to the successful series held on the first day of the Rochester meeting last year, on Monday. Tuesday and Wednesday mornings are to be devoted to dry clinics with a symposium on "Recent Acquisition in Endocrinology" featuring Tuesday afternoon's program. One hour of program time each day will be given over to demonstrations for small groups and to exhibits.

AMERICAN CONGRESS OF PHYSICAL THERAPY

MIDWESTERN SECTION

The Mid-Western Section of the American Congress of Physical Therapy will hold its spring session on Tuesday, March 13, 1934, at Indianapolis, Indiana. The morning will be devoted to clinics at the University and Indianapolis City Hospitals. The afternoon scientific session, commencing at one o'clock, will be held at the Indiana University School of Medicine. The evening session at eight o'clock will be held jointly with the Indianapolis Medical Society, at the Athenaeum.

MINNESOTA STATE MEDICAL—UNIVERSITY CLINIC

On Monday, March 26, 1934, and Tuesday, March 27, 1934, clinics will be given at the University of Minnesota Hospitals from 8 A. M. until 9 P. M., except for a fifteen minute recess mornings and afternoons and an hour for lunch and dinner. The clinics will each be of a half hour's duration and will be given by members of the Clinical Staff of the Medical School of the University of Minnesota.

Seventeen clinics on the diagnosis and treatment of cancer and seventeen clinics on practical subjects in medicine, neurology, dermatology, surgery, urology, orthopedics, obstetrics, gynecology, ophthalmology, otolaryngology, diagnostic x-ray and preventive medicine.

The clinics in malignancy will include the bladder, prostate, bone, breast, bronchi, lung, esophagus, eye, lymph node, lip and oral cavity, ovary, pharynx, larynx, rectum, skin, stomach and uterus. In addition, special demonstrations will be made of the use of x-ray and radium. All of the clinics will be practical and patients will be shown.

Registration details to be announced later.

KANDIYOHI-SWIFT-MEEKER SOCIETY

A fracture course has been organized by the Kandiyohi-Swift-Meeker County Medical Society consisting of six Thursday evening dinner meetings to be held at the Lakeland Hotel at Willmar. Six Minneapolis surgeons have been requested to present the course. The dates, subjects and speakers are as follows:

February 8: "Head Injuries, Fractures of the Facial Bones and of the Cervical Spine"—DR. ARTHUR A. ZIEROLD.

February 15: "Fractures of the Clavicle, Scapula, Ribs, Sternum and Dorsal Spine"—DR. ROBERT F. MCGANDY.

February 22: "Fractures of the Upper Extremity"—DR. RICHARD R. CRANMER.

March 8: "Fractures of the Pelvis, Sacrum, Coccyx and Lumbar Spine"—DR. EDWARD A. REGNIER.

March 15: "Fractures of the Femur and Patella"—DR. ROSCOE C. WEBB.

March 22: "Fractures of the Tibia, Fibula, Ankle and Foot Bones"—DR. WILLARD D. WHITE.

TODD COUNTY SOCIETY

Todd County Medical Society was organized in November, 1933. At the first meeting the following officers were elected: President, W. W. Will, Bertha; secretary and treasurer, B. L. Gifford, Hewitt. Charter members were: J. M. Cook, Staples; W. J. Lund, Staples; Chas. Reichelderfer, Staples; F. N. Grose, Clarissa; M. E. Mosby, Browerville; J. T. Laughlin, Grey Eagle; E. J. Simons, Swanville; B. F. Van Valkenberg, Long Prairie; F. W. Van Valkenberg, Long Prairie; G. R. Christie, Long Prairie; R. L. Christie, Long Prairie.

Meetings are held every six weeks with a dinner for all. The doctors' wives are always invited and play bridge during our meetings. Three meetings have been held this fall with the doctors of Bertha, Staples, and Long Prairie as hosts.

Attendance at all meetings has been practically one hundred per cent. Guest speakers have been A. W. Ide, M.D., Saint Paul; L. F. Hawkinson, M.D., Brainerd, and W. F. Wenner, M.D., Saint Cloud.

The next meeting will be held at Browerville, April 5, 1934. All physicians and their wives in the neighborhood of Todd County are cordially invited to attend.

B. L. GIFFORD, *Secretary*.

UPPER MISSISSIPPI SOCIETY

Officers elected at the recent meeting of the Upper Mississippi Medical Society held in Brainerd, Minnesota, are as follows: President, Dr. R. A. Beise, Brainerd; first vice president, Dr. C. Z. Kerlan, Aitkin; second vice president, Dr. A. M. Watson, Royalton; third vice president, Dr. Tom Davis, Wadena; secretary-treasurer, Dr. G. I. Badeaux, Brainerd.

Delegates to the State Medical Society convention are Dr. J. A. Thabes, Sr., Brainerd, and Dr. Tom Davis, Wadena; alternates, Dr. B. W. Kelly, Aitkin, and Dr. Hendrickson, Wadena.

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of January 10, 1934

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, January 10, 1934. Dinner was served at 7 o'clock. The meeting was called to order at 8 o'clock by the president, Dr. A. E. Wilcox.

There were fifty-eight members and seven guests present. This was the annual meeting of the Academy and members had been notified that they might bring as their guests their sons who are either practicing or studying medicine, or medical students in whom they are interested.

Dr. J. L. Rothrock, a past president of the Academy, was elected to Honorary Membership.

THE RISE OF CLINICAL THERMOMETRY IN THE UNITED STATES

DR. C. D. FREEMAN, the retiring president, read his presidential address on the above subject. (To be published in full.)

The meeting adjourned.

R. T. LA VAKE, M.D.
Secretary.

WOMAN'S AUXILIARY

President—MRS. A. A. PASSER, Olivia
Chairman Press and Publicity—MRS. GLEN R. MATCHAN,
Minneapolis
Editor—MRS. S. H. BAXTER, Minneapolis

STATE MEETING

Speakers for the annual meeting of the State Auxiliary at Duluth, July 16, 17 and 18, 1934, include Dr. W. Bierring, Des Moines; Dr. Arthur J. Cramp, Chicago, and local doctors. Dr. Cramp is director of the Bureau of Investigation and will give a cosmetic talk under the title "Mrs. Gullible's Travels in Cosmetic Land." Dr. Bierring is president of the American Medical Association.

BLUE EARTH AUXILIARY

A meeting of the Blue Earth Auxiliary was held January 29, 1934, at the home of Mrs. R. G. Hassett. Dr. A. E. Sohmer gave a talk on "Cancer Education."

The following members were elected to office for the ensuing year: Mrs. R. G. Hassett, president; Mrs. M. I. Howard, vice president; Mrs. A. W. Eckstein, recording secretary; Mrs. A. J. Wentworth, corresponding secretary; Mrs. I. V. Miller, treasurer.

This Auxiliary has a 100 per cent organization and meets monthly. The members have been sewing for local destitute families.

ST. LOUIS AUXILIARY

Meetings of the St. Louis Auxiliary are held each month and the activities include a horoscope tea; German party; dessert bridge; annual dinner dance; scholarships for nurses; Christmas baskets for the rural districts of the county; entertainment of the Woman's Auxiliary at the State Convention next July. First

prize in the Radio Contest sponsored by the Public Health Association was won by Irving Copolowich of Duluth. The plaque donated by the State Auxiliary was presented to Mr. Copolowich by Mrs. Anthony Bianco, president of St. Louis County Auxiliary, at a ceremony held at the High School, January 28, 1934.

HENNEPIN COUNTY AUXILIARY

The Women's Auxiliary of the Hennepin County Medical Society has begun this year of 1934 with much activity, and the members are responding with such a fine spirit of enthusiasm and coöperation that we feel assured that every committee is well repaid for its efforts.

On Friday afternoon, January 5, about sixty members of the Auxiliary met in the club rooms of the Hennepin County Medical Society for a bridge and bunco party. During the afternoon Mrs. W. W. Moir lead the group in singing a very fetching ditty to the accompaniment of a series of gay posters hung on the wall.

A joint meeting of the Auxiliary and the Medical Society featured the evening of February 5, when about 350 gathered for an evening of jollity and good fellowship in the club rooms. The committee in charge of general arrangements consisted of Mmes. Harold S. Wahlquist, C. A. Boreen, J. M. Lajoie, R. F. Erickson, W. W. Moir, Harvey Nelson, and R. R. Noice. No effort had been spared to make every minute festive with the valentine spirit from the time we entered the door of the assembly room, which had been converted into a bower of hearts and balloons, until we partook of a bountiful Duch lunch. The program was one of unusual merit rendered by members of the two groups. It was a revelation to all of us that we have within our membership such operatic, symphonic, and dramatic stars.

"The Low Brow Orchestra" which furnished music throughout the evening consisted of Drs. Percy Ward, S. H. Schaaf, Walter Fink, Russell Morris, E. D. Anderson, R. F. McGandy, R. T. LaVake, C. E. Proshek, P. W. Geissler, L. M. Daniel.

Appearing in the costumes of the gay nineties, and singing the songs of that day, the Floradora Sextette was much applauded for their pantomime and song. Mmes. Gilbert Seashore, Karl Anderson, J. P. Heiberg, Ralph Knight, S. J. Cheleen, Leo Fink, were the members of the sextette, and Mrs. D. F. Fitzgerald, the accompanist.

"A German Children's Symphony" assisted the "Low Brow Orchestra" in a group of numbers, and brought much merriment to the guests. This group consisted of Mmes. J. H. Carey, S. H. Schaaf, Carl Waldron, Harvey Nelson, R. H. Creighton, A. N. Bessessen, Jr., and J. F. Curtin, and they were attired in juvenile costumes to the nth degree.

A group of mixers consisting of Drs. and Mmes. Joel Neal, Frank Hirschfield, and J. H. Simons, added zest to the program.

Mrs. R. M. Pederson, in her characteristic way, entertained us delightfully in Scandinavian dialect.

Personal touches in the form of fake calls on the screen and slides of a few baby pictures brought many a laugh.

Such merriment necessitated police guard and Drs. L. F. Richdorf and Larry Doyle proved most efficient traffic cops.

Community singing led by Dr. LaVake and the crowning of Dr. C. A. Stewart, president of the Hennepin County Medical Society, and Mrs. S. A. Erb, president of the Auxiliary, as king and queen of the Valentine Party, raised their spirits to the highest degree for the Dutch lunch to follow, served by a group of Auxiliary members in valentine garb.

TRANSACTIONS OF THE MINNEAPOLIS SURGICAL SOCIETY

Stated Meeting held December 13, 1933
The President, DR. KENNETH BULKLEY, in the Chair

DUPUYTREN'S CONTRACTURE

A. A. ZIEROLD, M.D.

In 1832 Dupuytren reported a peculiar contracture of the palm which had been noted by a number of other surgeons and which had been commented upon but which had not been satisfactorily explained up to that time. He reported his observations and conclusions, and from that date his name has been attached to this clinical entity. He had the good fortune to have opportunity to dissect the hand of a man who had been killed accidentally and who had had a contracture of the palmar fascia. On the basis of this dissection and his observations at that time, he developed his treatment of the condition. Up to that time, it had been noted, but had been considered an incurable condition, one which, presumably, was related to injury or work involving the palm of the hand.

As you recall, the palmar fascia extends from the annular ligament down to the bases of the fingers, sending a twig medially, particularly on each of the three outer fingers and occasionally splitting, sending one to either side and really forming a contractor of the palm of the hand, should it be contracted. The palmar fascia, of course, can be rendered tense by the tendon of the palmaris longus with which it is continuous.

The condition which bears Dupuytren's name is a peculiar contracture of the palm beginning in the third finger, ordinarily involving the third and fourth fingers and usually involving the fingers of both hands. It is most common in males past forty years of age.

There are a number of observations with a tendency toward the belief that this is a familial condition, occurring in various members of certain families, and there also has been a great deal written regarding its relation to injury. This latter relationship has never been substantiated. We can accept today the fact that when Dupuytren's contracture is once established, injury will call attention to it and may aggravate it, but probably has nothing to do with the initiation of it.

The lesion in itself is a fibrosis of the palmaris fascia. With that progressive fibrosis there is a loss of subcutaneous fat and an increase of the fibrous trabeculae attaching to the skin. The resulting contracture of the whole fascia flexes the proximal phalanges of the fingers to which it is attached.

The patient whom I have the privilege of presenting to you this evening is thirty-two years old. Twelve years ago, while playing baseball, he noted a burning tenderness in the left hand. On further examination he noted a contracture of the third and fourth fingers. This gradually increased until the fourth finger was pulled down very near to the palm of the hand. The third finger was affected to a lesser degree. Some two or three years later he noted a similar affection of the other hand. The condition persisted and progressed slowly until I saw him two years ago. His family history is entirely negative. There is no one else in his family who has a similar complaint. There is nothing in his personal history of any consequence whatsoever and no other physical disability. The laboratory or clinical findings are of no importance.

Two years ago, I removed the palmaris fascia from the left hand and since that time he has been able to extend the hand completely and there has been no recurrence of the contracture. You will notice that the incision was made at the outer border of the palmaris fascia, and that the skin was reflected, the palmaris fascia dissected out and removed completely. If you

will examine the hand closely you will feel a peculiar softness due to the loss of the palmaris fascia. There is still sufficient subcutaneous fat to act as a pad, but there is a definite loss of the normal palmar resistance. The right hand still has the characteristic contracture identified by Dupuytren's name. You will notice the outstanding feature; the attachment of the fibrous fascia to the skin, the curves of the folds of the skin pointing with convexity to the fingers. You will also notice that the contracture involves the proximal phalanx, not the terminal phalanx and that there is no affection of the joints and no involvement of the tendons.

DISCUSSION

DR. WILLIAM PEYTON: About two or three years ago we felt that if x-ray therapy was effective in the condition of keloid, which is excessive scar formation, it might also be effective in the treatment of this condition. In the meantime we have treated two or three cases with apparently favorable results, that is, they have not progressed. None of them have had extensive contracture at the time the treatment was started, but they have not developed more contracture in the meantime and the palpable evidence of this condition in the hand has disappeared to some extent.

Of course, we do not expect to completely obliterate scar tissue which has already formed, but we hope to prevent further scarring and it seems, although it is too early yet to come to any final conclusions, that it does serve that purpose.

I would like to hear Dr. Zierold discuss the differential diagnosis of this condition in regard to xanthoma of the hand.

DR. R. C. WEBB: The question of the relation of trauma to Dupuytren's contracture has been mentioned and in that connection I would like to report a case on which I operated a few years ago. The patient was a lawyer by occupation and there was no history of trauma as a cause of his condition. In addition there was a family history of Dupuytren's contracture, both his mother and a sister having the condition.

DR. J. M. HAYES: I have seen some of these patients treated with x-ray. I was not sure that the treatment had been given by one who had a very wide experience, so that may have accounted for the poor results.

I have seen Dr. Kanavel demonstrate many of these cases on which he had operated and his results were usually very good. No doubt, removal of the palmar fascia is an extensive surgical operation and it would be a great relief to these patients if good results could be obtained by x-ray therapy.

The patient of Dr. Zierold's has obtained a nice result.

DR. GILBERT COTTAM: Free excision of the involved portion of the palmar fascia, as in the case shown, is the only treatment of Dupuytren's contracture which offers complete relief, in my experience. The old multiple subcutaneous division, with splinting in full extension, does no permanent good and should be discarded. I have had no experience with x-ray treatment. We are still in the dark as to the cause, for this lesion occurs as often among those who do not use their hands for heavy work as in laboring people and there is not always a definite history of injury.

DR. A. A. ZIEROLD: Any discussion of Dupuytren's contracture will invariably lead to the effect of injury. So far as I have been able to determine, injury is not

a potent factor. It serves to identify the lesion and, in addition, possibly tends to aggravate it, but probably not to initiate it. The fact that we see these conditions in the hands of those having executive positions quite as often as we do in the hands of those who do manual labor, would tend to corroborate or strengthen the idea that injury is not a vital factor.

I was interested in Dr. Peyton's remarks. I had intended to comment upon xanthoma as it has been my belief that the successful exhibition of x-ray occurred in those cases which were xanthomata rather than Dupuytren's contracture. I do not know from experience nor do I know of anything in the literature which would substantiate the use of x-ray therapy in typical Dupuytren's contracture.

The diagnosis of Dupuytren's contracture, I think, cannot be made beyond any question of a doubt until you have a paired contracture. I believe it is dangerous to make the diagnosis from one hand alone. You can say that the position of the folds of the skin, the loss of the subcutaneous fat, and the obvious contracture of the fascia rather than of the tendons are sufficient criteria to make the diagnosis, but they can be simulated by injury and in the event of a unilateral lesion I would be hesitant to make a diagnosis of Dupuytren's contracture.

REPORT OF THE MEETING OF THE WESTERN SURGICAL ASSOCIATION

R. C. WEBB, M.D.

The Western Surgical Association meeting was held in Cincinnati, December 8 and 9, 1933, and the papers presented covered almost the entire field of surgery.

In discussing peripheral nerve transplants where end-to-end approximation of the divided nerve ends cannot be obtained by any of the usual methods, attention was called to the fact that the various methods of bridging the gap have been unsatisfactory. A new method was presented which consisted of taking a few inches of a corresponding nerve from a freshly amputated extremity and inserting it into the gap. The proximal end will grow into the transplanted nerve but when it reaches the distal end of the transplanted nerve sufficient scar tissue will have formed to prevent further growth and a second operation is required in which the barrier is removed and a re-suture of the distal end is performed.

Carcinoma of the breast was discussed and a series of cases presented. There were 26 per cent of five-year cures and 14 per cent of ten-year cures. Excision of the tumor and simple amputation of the breast produced no five-year cures. The radical operation was considered the most efficient weapon. In the discussion, however, one surgeon stated that he had abandoned the radical operation and was merely doing mastectomy.

In surgery of the chest attention was called, by means of a series of cases of pulmonary tuberculosis with upper lobe cavities, to the value of the operative removal of the upper three or four ribs which seemed to obtain greater and more selective compression than any other method. The value of the shortness of the posterior stump of the ribs was emphasized.

Acute empyema was presented as a complication of another disease consisting of an abscess in the pleural cavity which has been adequately walled off and which should be differentiated from an infectious pleurisy which is the early stage and which is not yet walled off. A closed drainage was advocated in infectious pleurisy and open drainage in true empyema. The value of the use of a proteolytic solution and the early removal of the fibrinous exudate was stressed. Also the early removal of the drain as soon as the symptoms have subsided and further progress controlled with x-ray examinations was discussed. Practically the sug-

gestions were, first, to drain by aspiration, second, to follow this with closed drainage when indicated, and third, with open drainage.

In abdominal surgery a gallbladder incision which has been reported from time to time was again shown, consisting of an upper right rectus incision through the anterior rectus sheath with retraction of the rectus muscle laterally and a transverse incision through the posterior sheath. The average time in bed with this incision was four and one-half days.

The appendix received considerable attention as is also proper. A series of cases was presented where the abdomen was explored for atypical symptoms and where appendectomy was the only operation performed. The study five years later showed 69 per cent of cures and eight partial cures. Appendicitis mortality was discussed and the high mortality in the United States as opposed to the low mortality in Europe was presented in the series of three hundred cases presented. The mortality in this series was five per cent but the mortality among the ruptured cases was 16 per cent. The mortality in the cases where cathartics had been used was decidedly increased and the unfortunate part was that in some of these cases the cathartic had been given by physicians. A remarkable series of European statistics was presented where the mortality was but 1 per cent and it was interesting that the administration of gas bacillus serum was a routine procedure in the ruptured cases in this series.

Ileac carcinoid and lymphosarcoma of the cecum with operative cures were presented as a matter of interest. The intraperitoneal hernias through mesentery defects present a rare abdominal condition which must, however, be kept in mind in cases of intestinal obstruction. The discussion on intraperitoneal hernias brought out many similar experiences. Diverticulitis of the various parts of the intestinal tract was presented as a rarity and the mortality in the large bowel cases was presented as 37.5 per cent. The usefulness of cecostomy in diverticulitis of the large bowel was illustrated. A large sarcoma of the duodenum was shown with operative removal and cure but the possibility was suggested that more efficient staining might have shown it to be neuroma.

Bleeding polypoid tumors of the large bowel were presented by means of a series of cases and their tendency to malignant degeneration was shown. Prompt removal of all adenomas and papillomas was advocated.

A rather large series of carcinoma of the penis was presented and the value of the complete operation consisting of removal of the lymph nodes in the inguinal region on both sides as well as the nodes in Scarpa's Triangles with complete removal of the penis and implantation of the urethra in the perineum posterior to the scrotum was illustrated. In a few cases the scrotum and testes were also removed.

Surgery of the kidney was presented in connection with a series of cases conservatively treated by resection. The up-to-date surgeon should not be proud of the number of kidneys removed but rather of the number of kidneys saved or conserved. Fifteen cases of resections of the kidney were shown for solitary cysts, carbuncle of the kidney, double kidney, benign tumors, and other conditions in which the disease process did not include the entire kidney. The value of mattress sutures to control bleeding and occasional fat transplants included in the suture line was presented.

Moving pictures illustrating resection of the right colon for carcinoma were shown. A method of anastomosing the end of the lower ileum to the side of the transverse colon in an aseptic manner, using the special clamp, was beautifully illustrated.

The repair of inoperable inguinal hernias by the use of a large sheet of fascia lata which had been left attached at its upper end and was shifted subcutaneously to the region of the defect, was illustrated by

a beautiful series of slides and a small series of successful cases was shown.

Fractures and their status in the field of surgery was the subject of the presidential address. Many well known facts were reviewed and it was lamented that oftentimes a Boy Scout could give instruction to our junior internes.

Fractures of the elbow were discussed as serious cases which demand early reduction and a series of severe fractures of the elbow with very satisfactory results was presented in detail.

DISCUSSION

DR. THEODORE H. SWEETSER: I wish to use Dr. Webb's remarks regarding the mortality of appendicitis as an excuse for a warning that amebic dysentery must be kept in mind especially at this time. In my work for the State Medical Association I was asked last week by the State Department of Health to listen to a discussion of proposed public health measures for the control of amebic dysentery.

I wish to emphasize just one fact which was brought out only incidentally. It was noted that the general mortality of all cases in the present outbreak has apparently been under 10 per cent, but that, among the patients who have undergone operation, most of them for supposed acute appendicitis, the mortality has been 80 per cent. That is a startling comment, the list including many prominent names. I recognize that delay in the treatment of acute appendicitis is often most unwise, and that the laboratory diagnosis of amebic dysentery is sometimes difficult and time consuming, but I wish to ask that we all keep amebic dysentery very sharply in mind in the differential diagnosis of abdominal disturbances, especially suspected acute appendicitis.

THE DIAGNOSIS OF KNEE JOINT INJURIES

INAUGURAL THESIS

HARVEY NELSON, M.D.

Considerable time is spent in our schools in emphasizing a methodical history taking to elicit characteristic symptoms, and in developing a routine technic of physical examination of inspection, palpation, percussion and auscultation of hearts and chests, of inspection, percussion and palpation of the abdomen; but little, if anything, is done to develop a routine method of examination of just as common conditions as back and joint injuries. It is, therefore, the express purpose of this paper to emphasize a routine procedure of examination in knee joints and outline in as much detail as time allows the most frequent type of injuries that should be commonly looked for. It is only by careful application of the principles of a methodical examination that we, as individuals, can expect to establish a definite diagnosis. We would be laughed at if we would hide behind a diagnosis of an abdominal colic or old-fashioned cholera morbus and still how many of us have merely looked at a swollen knee, called it a sprain and advised the patient to apply heat and an elastic support.

Anatomy of the Knee Joint.—A brief understanding of the mechanical and anatomical structure of the knee joint is essential and is easy to assimilate.

The knee joint is the largest joint in the body and being superficial as well as dependent for its strength on its soft tissue structure, is easily susceptible to injury. It is in reality a double joint or two separate joints with a full set of component ligaments with the whole functioning roughly as a hinge. We have the femur above with its internal and external tuberosities of the tibia below. The joint spaces of the tibia are deepened by the two semilunar cartilages—the in-

ternal and external. The two joint spaces are separated in the mid-line by the tibial spines to which are attached the crucial ligaments which stabilize the knee joint from front to back. Stabilizing the joint from side to side are the internal lateral and the external lateral ligaments. The internal lateral ligament, located on the inner side, extends from the mesial aspect of the internal condyle of the femur to the posterior mesial aspect of the inner tuberosity of the tibia. This internal lateral ligament is attached in its descent to the internal semilunar cartilage, especially in the posterior portion, a fact of considerable importance as it is a cause for the detachment of this cartilage. The external lateral ligament, with a short and long portion, extends from the external condyle of the femur postero-laterally to the head of the fibula. The tendon of the popliteus muscle lies between the external lateral ligament and the tibia separating the external lateral ligament from the external semilunar cartilage, another fact of considerable importance as it is a reason for the relative infrequent detachment of the external semilunar cartilage. Anteriorly, the patellar tendon, patella and the quadriceps tendon act as the anterior stabilizing ligament. Posteriorly, the capsule is somewhat thickened, forming the posterior ligament. In addition to this, the joint capsule is, of course, complete throughout but of less clinical significance than the above special areas of reinforcement. The patella slides up and down on a special anterior articular surface of the femur in which nature has made the lateral condylar portion more prominent than the internal to prevent lateral dislocation of the patella.

About the knee joint are a number of bursæ which are of clinical interest and which may communicate with the joint. The most important of these are the prepatellar, suprapatellar and infrapatellar anteriorly and some seven or eight bursæ posteriorly, all of which are in relationship to the tendons in this region. The most important of these latter is located under the internal head of the gastrocnemius tendon. A brief résumé of the synovial membrane completes a working knowledge of the important anatomical structure of the knee joint from a clinical standpoint. The synovial membrane lines the joint throughout its superior, anterior and posterior compartments and has the capacity of forming the synovial fluid.

Routine Examination of the Knee Joint.—What sort of routine procedure should we follow in examining the knee? I do not believe it is sufficient in the history to merely acquire the information that a knee joint has been hurt. Certainly if an internal lateral ligament might be torn by a sudden inward bending, or an internal cartilage detached by a sudden inward twist or torsion of the femur on a fixed tibia, it is important to obtain this history. A history of a fall or a direct blow to the knee joint might suggest a fracture of the patella or the upper portion of the tibia and do not forget that many a patient has walked into the office on a fracture of the condyles of the tibia. The type of strain or injury should immediately suggest the possible damage that has been done. The conduct of the patient following the injury should also suggest the severity and in some respects the type of injury sustained. If the leg is weak it is important to know in which direction the knee tends to give way. In detached semilunar cartilages, the history is especially of vital importance.

I believe that the procedure of the examination proper can be divided into inspection, palpation, testing of motion, taking of measurements and finally such laboratory studies as x-ray and aspiration.

An excellent practice to follow is to always expose both knees. Localized and even generalized swelling can only be always determined by direct comparison with the opposite normal joint. One training that the estimation of industrial disabilities does accomplish is the constant utilization of the opposite uninjured mem-

ber as a basis for the normal of any specific member. The patient should thus sit before the examiner and both knees should thus be inspected in both the flexed and extended positions for any swelling or irregularity.

A good method of palpation is to use a thumb on each knee. Any irregularity can be felt and compared. Any tenderness should be accurately located. The tenderness of an injured lateral ligament is located to the lateral or medial side of the knee and most frequently over the attachment of the ligament above or below the joint space. Here, too, the knee should be palpated in both the flexed and extended positions. I have frequently been able to determine tenderness over the internal semilunar cartilage with the knee flexed where in the extended position, the tenderness was indefinite. If so indicated, the bursæ should be palpated and the presence of chronic thickening or loose bodies in the prepatellar bursa noted if a bursitis is present. If there is any question of a loose cartilage or a loose joint body, this should be patiently felt for. The palpation of a loose body in the joint space on one occasion is ample reward for repeated fruitless manipulation of the joint. Finally, the presence or absence of crepitus should be noted and the common crepitus of the patella or prepatellar bursa is not to be confused with a true crepitus of the knee joint. As a general rule, a harsh grating crepitus in the joint indicates a synovial involvement whereas a clicking crepitus indicates a bony involvement or possibly a loose cartilage. Moorhead suggests the use of the stethoscope as an adjunct in this step.

Under the heading of "testing of motion" is included both the determination of the normal joint movement of flexion and extension and also the lateral and crucial ligament mobility. In testing out the range of motion, we have made a practice of recording accurately the range in degrees in each knee. This gives a permanent and accurate record which cannot be obtained otherwise. Increased lateral mobility is tested for both with the knee slightly flexed and with it in the relaxed extended position. Here, to, a careful comparison of the two sides is of vital importance. We have found that an easy way of determining this is by having the patient in a sitting position with the leg supported horizontally by one of the examiner's hands holding the back of the knee and the other grasping the leg. With the surgeon in the standing position first on the outer and then on the inner side of the knee, the examiner can brace his own knee against his hand supporting the knee, test the mobility first of the internal lateral and then of the external lateral ligament, with the patient's knee braced against his own. The advantage of this method is that the procedure is steadier and I find that it is often difficult, especially in large patients, to steady and control the patient's knee with the hand alone. In cases of strain of the lateral ligament without relaxation, this testing of the lateral mobility will cause pain but only when the stress is placed on the injured ligament and only in the region of the ligament or its attachments. Increased crucial ligament mobility can be determined both with the knee flexed and extended. With the patient in a sitting position and the foot resting on the floor, the lower femur is steadied with the left hand and the upper tibia firmly grasped with the right hand and worked back and forth. When the knee is extended, it can also be steadied with the left hand while the right hand, grasping the lower leg, forcefully pulls forward and back in the manner of opening and closing a drawer. In chronic joint effusions, more or less relaxation of all the ligaments will frequently be found.

The taking of measurements graphically pictures certain conditions that are present. In this age in which industrial surgery cannot be entirely separated from general surgery, it also gives us a valuable permanent record of the degree of swelling or atrophy and the range of function that is present. The circumference

of the thigh at a fixed point, the circumference of the knee, the calf and lower leg give the complete picture. Checking the range of movement is a simple procedure which requires only the use of a carpenter's angle rule which can be secured in any hardware store. The fixed points are laterally the greater trochanter of the femur, the lateral condyle of the femur and the lateral malleolus of the tibia. In the anterior view the fixed points are the anterior superior spine of the ilium, the middle of the patella and the great toe.

I believe that the only subjects from the laboratory that need to be mentioned here are first, aspiration and, secondly, the x-ray. The use of aspiration for diagnostic as well as therapeutic purposes is too frequently neglected. Early aspiration of fluid where the knee joint is distended, repeated if necessary, and followed by the application of a firm compression bandage is of definite therapeutic value. The frequent finding of hemorrhagic or sero-hemorrhagic fluid is practically diagnostic of a traumatic synovitis in the absence of a fracture into the joint. If such a procedure is done under aseptic technique with the needle entering the joint lateral to the mid position of the patella and directed upward and medially underneath the patella into the superior compartment above the central portion of the patella, there are no important structures to be injured.

With regard to x-rays, suffice it to say that any injury to the knee important enough to require a definite diagnosis is important enough to require x-rays to rule out a fracture. Often an angle plate will be helpful, especially where loose bodies are suspected.

Common Injuries to the Knee Joint.—As we have previously stated, it is not possible to discuss with any detail the numerous possible injuries to a knee joint. In order to properly execute an examination of a knee joint, however, it is necessary to be familiar with the signs and symptoms of the common injuries that might occur. In concluding, therefore, I will discuss briefly: (1) synovitis and the ordinary sprains; (2) injuries to the lateral and crucial ligaments; (3) internal derangements of the knee joint, especially of the semilunar cartilages, and finally (4) fractures.

The term synovitis has come to be used rather carelessly but is usually meant to infer a sprain or a contusion-sprain. It would be well to remember that the effusion that accompanies a synovitis may be merely a symptom which should, in itself, not be accepted as a satisfactory diagnosis until all other accompanying more serious injuries have been ruled out. Unlike a synovitis in the ankle, for example, a sprain of the knee may be complicated by a derangement of the intra-articular structures, as for example, an internal semilunar cartilage or the lateral or crucial ligaments. In the history of a sprain of the knee, we may have a direct blow to the knee or more often, a torsion or inward bending of the knee which may or may not be accompanied by a direct blow. In these cases, we find an effusion of the joint, which causes the patella to be "floating" in the more severe cases. A typical synovitis due to trauma, I believe, forms a fluid which is more often hemoserous than purely serous.

Aside from the simple sprain or so-called synovitis, I believe that the most common injury that is encountered is the injury to the lateral ligament, particularly the internal lateral ligament. Rupture of the internal lateral ligament is caused by an over-abduction of the leg which may or may not be accompanied by a certain amount of torsion. Obviously, rupture of the external lateral ligament is caused by the opposite force in which there is an over-adduction which may or may not be accompanied by torsion. The same mechanism which might rupture the internal or external lateral ligament might also cause a detachment or derangement of the cartilages. After the acute injury, there is pain, increased intra-articular fluid, possibly ecchymosis and most certainly some swelling with tenderness over the

injured ligament, particularly at its attachment. The clinical findings may vary from a mere pain upon putting strain upon the injured ligament to a complete rupture of the ligament in which there is very little if any restraint through abduction or adduction of the knee. External rotation may be increased when there is a relaxation of the internal ligament and internal rotation may be increased when there is a relaxation of the external ligament accompanying the increased abduction and adduction. The patient practically always has a feeling of instability and weakness in the injured knee joint.

In the case of the crucial ligament, the anterior crucial ligament can be injured by the same force which causes derangement of the internal cartilage and the posterior by the same mechanism that causes damage to the external cartilage. Extreme torsion may also rupture the crucial ligaments and fractures are occasionally accompanied by rupture of the crucials, with or without an accompanying fracture of the tibial spine. This injury is determined by an increase of the forward and backward play in the knee joint in which a ruptured anterior crucial ligament allows an increase of the forward gliding of the tibia with hyperextension of the knee joint. If the posterior ligament is ruptured, backward gliding of the tibia is increased. In these cases, it might be possible to elicit a tenderness over the tibial spine anteriorly when the knee is flexed on pressing just medial to the patellar tendon. When the posterior ligament is involved, there may be tenderness just below and internal to the lower portion of the patella with the knee joint flexed. The later symptoms of crucial ligament injuries are instability of the knee joint in which the patient describes a tendency for the knee to give way forward. In these cases too, there is a tendency toward hyperextension on occasions.

We have already discussed to some extent the mechanism of injury to the internal and external semilunar cartilages and have already stated that the detachment of the internal semilunar cartilage is much more frequent than in the external. In the case of the internal semilunar cartilages, the detachment is usually brought about by an inward twist and torsion of the femur upon the fixed tibia often associated with an abduction of the leg. The mechanism of injury is obviously much similar to the mechanism of injury to the lateral ligament. The pain is usually sudden, intense and located over the region of the cartilage which has been detached. With this, the joint is locked and cannot be extended until the cartilage replaces itself. In some knees that are untreated, limited extension may persist for a considerable period of time. The locking and limited extension are accompanied by increased fluid in the knee, subsequent swelling and pain with tenderness over the local area of the cartilage. Repeated lockings are the common history and in time, the patient himself learns to manipulate the knee until the displacement corrects itself. The history of locking followed by swelling and subsequent soreness, the finding of localized tenderness over the cartilage and the palpation of a movable cartilage on manipulation of the knee are diagnostic signs and symptoms.

Time only permits a brief resume of the various fractures which may occur in the region of the knee joint. The majority of fractures in this area are accompanied by severe trauma so that the presence of a fracture in itself is apparent. These fractures, therefore, do not come entirely within the scope of this paper in which it is our primary intention to outline a routine procedure of examination of the knee joint. Aside from the fractures that have already been mentioned, as for example of the tibial spine, the most common fracture in the region of the knee joint is that of the patella, with second in frequency, fractures of the plateau of the tibia. In both of these areas, it is not uncommon for fractures to be overlooked where such fractures do not involve the bone in its entirety.

It is the duty of the attending physician to x-ray all injured knee joints which are accompanied by objective findings of trauma, as it is only in this way that fractures can be entirely ruled out. Considerable damage might be done to a patella or quadriceps tendon by the patient walking around with a patellar fracture, to the extent that an operative repair might be necessary whereas previously the treatment would be simple and conservative. The same is true of fractures of the condyles of the tibia where a downward displacement of the fractured condyle from weight-bearing might result in a definite and lasting instability of the knee joint with resulting permanent disability. Fractures of the lower end of the femur in the region of the knee joint I believe are comparatively rare and except in certain types of injury, would not, as a rule, involve the knee joint proper. Dislocations of the patella and the knee joint are also obvious injuries that are apparent on simple inspection.

The facts contained in this paper are, while rudimentary in character, given for the sake of simplifying and combining together various facts that we all know and should carry with us as a unit whenever a knee joint injury is encountered. The examination of the knee joint should be a methodical and pleasurable task. Accurate diagnosis can usually be made with a little care.

DISCUSSION

DR. R. F. MCGANDY: I think this has been a well presented paper and as most of us will agree, a timely one. The part of this paper which impressed me the most is the fact that examination of the knee joint has proceeded through definite stages. I think this fact has never been sufficiently stressed in school. We were taught how to carefully, in a routine way, examine a chest or heart but knee examinations were not brought out in the same light. It is only through a careful examination as Dr. Nelson has outlined that we can come to a definite conclusion as to the nature of a joint injury. This not only applies to knees but also to other joints such as the back. In this latter respect I have in mind an outline for the examination of lower back injuries which a member of this Society has recently compiled for use in railroad work. I feel that with some modifications this could be made to apply to knee joints and similar conditions.

DR. LEO MURPHY: I have enjoyed Dr. Nelson's excellent presentation. Since my attention has recently been called to the rather specific beneficial effect of x-ray therapy in cases of acute bursitis I am prompted to ask Dr. Nelson whether or not he has employed it, and with what results, in bursitis about the knee.

DR. J. M. HAYES: Dr. Murphy has mentioned the therapy of bursitis of the knee joint, and Dr. Ude's work. I am much interested in this since I happened to be one of his first victims of a painful bursitis.

I had charge of the physiotherapy department for the Veterans' Bureau from 1921 to 1926. During that time we treated many of these cases. We sometimes see diathermy used for treatment of almost every pathological condition. We found that diathermy gave very definite results in bursitis due to trauma, but usually not in those due to infection. Personally, I have not found anything that relieves the pain of acute infectious bursitis, as does x-ray therapy.

DR. E. A. REGNIER: I enjoyed the essayist's paper very much. The points brought out relative to the manner of arriving at a diagnosis are important.

I would have liked to have had Dr. Nelson elucidate further on certain diagnostic procedures about the knee joint. One thing, which has been obscure and where we have had no help from radiologists and where several consultants have frequently differed, as to whether you did or did not have ruptured crucial ligaments. There seemed to be no method we have at hand, except an operation, to prove that we have a ruptured crucial ligament, unless you can definitely demonstrate

the fracture of one of the tibial spines. Undoubtedly many such fractures are overlooked or obscured by adjacent fractures.

I would like to have Dr. Nelson speak further on that subject if he has any further information for us.

DR. R. C. WEBB: I have seen a good many knee injuries involving the semilunar cartilages in which the characteristic locking was absent. It is easy to diagnose an injury to the internal semilunar cartilage if the knee is locked and the x-ray does not show some other reason for the locking. When, however, the case does not exhibit the classical locking and is brought to a surgeon at some time after injury one dislikes to open the knee joint for an extensive exploration. In this connection I would like to emphasize the value of an exceedingly careful history and description of the manner in which the injury was received. When a man injures his knee joint in the classical manner which produces a cartilage injury and the complaints continue, the burden of proof rests on the person who states that the semilunar cartilage is not injured.

There is another point of interest to me and that is when one should operate on these cartilage injuries which are not locked. There is also a possibility that the patients may recover without operation when the injury is confined to the ligamentous attachments of the cartilage. In this connection, I would like to report the reactions of two patients who had injured the semilunar cartilages in one knee and five years later injured the semilunar cartilage in the other knee. These men were young, strong, well developed car inspectors who worked together. One of them had been under a car inspecting with his leg flexed and stretched backward when, for some reason, he suddenly decided to move from his position and injured his knee. I treated him for approximately six weeks and then operated upon him, removing a split internal semilunar cartilage, and in the course of a few weeks more he returned to work. His partner injured his knee in the same manner a few weeks later and I treated him and he was able to return to work in the course of a few weeks but his knee continued to bother him for two years. Five years later these same two patients, who had continued in the same occupation, injured the opposite knees, a few weeks apart. They had had five years in which to compare notes upon their two methods of treatment and the joint of interest was that upon receiving the same injury to the opposite knee they both demanded immediate operation. These two cases have interested me because they were two intelligent men and had had ample opportunity to judge the radical and conservative methods of treatment of injury to the internal semilunar cartilages.

DR. HARVEY NELSON: It has been my experience in the usual acute bursitis, that aspiration of the fluid and application of compression bandages usually causes the condition to clear up in a few days or a week or two. In the chronic or infectious bursitis, the x-ray might be of considerable value.

In answer to Dr. Regnier, regarding the crucial ligament, I still feel that a certain amount of relaxation in the crucial ligament could be determined by careful manipulation of the knee joint. The question which arises in my mind is that sometimes the injury to the crucial ligament is quite severe and the amount of play is relatively slight. I recall a case operated on for a cartilage about a year ago and the anterior crucial ligament was almost destroyed. It seems that the symptoms would have been marked but they were slight.

I cannot answer Dr. Bulkley's question as to the percentage of frequency of the fracture of the tibial spine in injuries to the crucial ligaments. I think an injury can occur to the crucial ligament and does occur quite frequently, without a fracture of the tibial spine just as it does to the internal and external ligament.

Dr. Webb's points are well taken. Obviously, injuries to the semilunar cartilage do not always follow the typical picture. I have been inclined to take the viewpoint, possibly I am wrong in so doing, that exploration of the knee is a procedure which should be done as exploration of the abdomen in certain cases. We recently had a case in which the man gave no history of locking, gave a history of his knee bothering him and feeling tender, the tenderness was located definitely under the internal semilunar cartilage and on two occasions I was able to feel a cartilage fragment in the internal joint space. The cartilage, at operation, was found to be split longitudinally and the medial fragment was completely in the joint space. It had been walked on and was completely frayed out. I think, rather than to encounter a condition of that kind in which permanent damage is done to the articular cartilage, it would be better to explore the knee joint.

I recently had occasion to examine a case which brought up a rather important fact regarding disability which I wish some of you men would comment on. A man detached his semilunar cartilage with a definite history. There was no question of the diagnosis. In the Fall of that same year it again locked and on each occasion he was laid up for six weeks or two months. Subsequent to this he had no trouble for about four months. Then, while working for a different employer, and with a different insurance company involved, the cartilage again locked and he was disabled for approximately eight weeks. He continued to work until January of that year when a fourth locking occurred with a subsequent disability and finally, in September, another locking occurred from which he is still disabled. I believe he has gone back to work but he has symptoms. On each occasion, a different insurance company was involved and there is a question as to who is going to pay the bill for the operation, whether the first insurer is to blame because of the first injury, whether the last employer is to blame because of the aggravation of the symptoms, or are the intermediate insurers to blame?

F. A. OLSON, M.D., *Secretary.*

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

BOOKS RECEIVED FOR REVIEW

NATURE, M.D. *Healing Forces of Heat, Water, Light, Electricity and Exercise.* Richard Kovacs, M.D. 181 pages. Illus. Price, cloth, \$2.00. New York: D. Appleton-Century Co., 1934.

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The Immunization of Student Nurses Against Scarlet Fever

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SINCE 1929 the Students' Health Service has been carrying out a program of immunization against scarlet fever among the nurses of the Central School of Nursing of the University of Minnesota. Nurses in this "Central School" are assigned to the Minnesota General Hospital (University), the Minneapolis General Hospital, and the Miller Hospital in St. Paul. Their service is a rotating one and at some time in it they receive training in the care of contagious diseases on the contagious wards of the Minneapolis General Hospital. This contagious service includes the care of scarlet fever patients. This report presents the results of the Dick test for susceptibility to scarlet fever done when these students enter the Central School of Nursing and the results of immunizations done on those who were found susceptible during the years 1929-1933 inclusive.

Within one week after admission to the Central School of Nursing, each student nurse was given a Dick test. This test was carried out according to the directions of the Scarlet Fever Committee. Exactly 0.1 c.c. of Dick toxin was injected intradermally in the forearm. The test was read between twenty and twenty-four hours afterwards. Any redness about the site of injection, even the slightest erythema if it measured 10 mm. in diameter, was called a positive reaction. The Dicks¹ have frequently called attention to the fact that, unlike the Schick test, a positive reaction to scarlet fever toxin as used in the Dick test seldom shows any induration and

that the slightest flush or reddening constitutes a positive reaction.

TABLE I—DICK TEST—STUDENT NURSES
1929-1933

	No.	Per cent
+ Dick Test on Admission	314	45.5
— Dick Test on Admission	376	54.5
Total tested	690	100.

A total of 690 nurses have been given Dick tests on admission. Of this number, 314 or 45.5 per cent gave positive reactions, indicating susceptibility to scarlet fever. This percentage of susceptible individuals in this age group corresponds very closely with the report of Rhoads³ who found 41.6 per cent positive reactions in a group of 913 nurses.

Six of our group who were Dick positive and thirteen who were Dick negative had had an unknown amount of scarlet fever toxin for immunization before entering the School of Nursing. Four of those who were Dick negative had received the five immunizing doses of scarlet toxin. One nurse who was Dick positive on admission and who had received an unknown amount of scarlet toxin was Dick negative two months later. Two who were Dick negative on admission and who had received an unknown amount of scarlet toxin were Dick positive six months later. These changes in reactions may have been due to errors in giving or reading the tests or to changes in immunity of the individuals due to the scarlet toxin they had received. The Dicks¹ list the common sources of error in the skin test as follows: "inadequate syringes and needles; attempts to sterilize the syringes and

*From the Students' Health Service and the Department of Preventive Medicine and Public Health, University of Minnesota.

needles with alcohol, which precipitates the minute amount of toxin in the skin test solution; failure to replace the water left in the needle after boiling with skin test solution by expelling at least 0.1 c.c. of solution through each fresh needle used; boiling the syringes and needles in alkaline tap water instead of in distilled water; estimation of the amount of skin test solution injected by the size of the wheal produced instead of accurate measurement by graduations on the syringe; subcutaneous instead of intracutaneous injection, and failure to observe the reaction between eighteen and twenty-four hours after the test is made."

The reliability of the Dick test as an indication of susceptibility or immunity to scarlet fever has been questioned. In our series, one case of scarlet fever has occurred in the 376 cases whose Dick test was negative on admission although the majority of these students have had their contagious service and have been in intimate contact with cases of scarlet fever. In Rhoads³ group, no case of scarlet fever occurred in the 533 nurses who had a negative skin test although they had cared for scarlet fever patients. Hektoen and Johnson² report 309 nurses who were found insusceptible by the Dick test and no scarlet fever occurred in this group, all of whom were exposed to the disease. From these reports on nurses it seems evident that a negative skin test does give reliable evidence of immunity to the disease.

Of the 314 cases in our series who showed positive Dick tests, 164 were given the five immunizing doses of scarlet fever toxin according to the following method as suggested by Rhoads.³

"First the Dick test is made by injecting exactly 0.1 c.c. of Dick test toxin intradermally on the volar surface of both forearms. Regular skin test syringes (made by MacGregor of Philadelphia) and 26 gage "Summit" needles are used. The syringe should be sterilized by boiling in distilled water only. Alcohol may precipitate the toxin, and alkaline tap water may alter it. The test is made on both arms to avoid error in technic. A control test is not necessary. The tests are observed from twenty to twenty-four hours later. It is unsafe to take readings after a lapse of twenty-four hours because a positive test may have faded by that time. Any degree of pinkness 0.5 cm. or more in any diameter is regarded as a positive test. Those found susceptible are immunized by being given the five graduated doses of immunizing scarlet fever toxin subcutaneously at intervals of one week. Only preparations of scarlet fever toxin approved by the Scarlet Fever Committee and so labeled are used. Two weeks

after the last dose of scarlet fever toxin, the subjects are retested and if the test is still even slightly positive a sixth dose, the same size as the fifth, is used."

The five graduated doses of scarlet toxin were given one week apart beginning with 500 skin test doses of toxin for the first dose, 2,000 skin test doses for the second, 8,000 for the third, 25,000 for the fourth, and 80,000 skin test doses for the fifth.

The Dicks¹ advise doing a skin test two weeks after the fifth dose of toxin and, if the skin test is positive, repeating the fifth dose. This was not followed out in our series as it was not practical to do so since the immunizing was done at the various hospitals. However, from four to twelve months after receiving the fifth dose of toxin, 136 of this 164 were Dick tested again. One hundred and twenty-eight, or 94.5 per cent, were negative to the test, and 8, or 5.9 per cent, were still Dick positive. Rhoads,³ the Dicks¹ and others report complete immunization in 95 per cent of cases with the five doses of toxin.

General reactions following the administration of scarlet toxin occur in about 10 per cent of individuals immunized.¹ Severe reactions have occurred in only a few cases and in no case were these serious. We do not have a record in our cases of the time lost from duty because of reactions but in Rhoads³ series of 190 nurses that were immunized, the average loss of time was 0.24 day per nurse.

Since 1929, there has occurred only one case of scarlet fever in this group of nurses. This case was in a student who gave a typical history of having had scarlet fever as a child and whose Dick test was negative. She became ill with an acute sore throat, fever, typical scarlet rash followed by desquamation. This probably represents one of the unusual cases which have been reported of scarlet fever occurring more than once in an individual. Except for this case, however, there has been no scarlet fever in the nurses who had negative Dick tests or who had been immunized. One case in a group of 690 nurses gives a rate of 1.4 per 1,000.

During this same period of time (1929-33) seven cases of scarlet fever have occurred in a group of 619 nurses who were affiliating with the hospitals in the Central School. These affiliating nurses were not Dick tested and there was no known immunization against scarlet fever. The length of affiliation was between three months and one year. The majority of these

affiliating nurses were not assigned to the contagious wards although some may have had contact with scarlet fever on other services. Assuming, however, that the 619 were all exposed, and seven contracted scarlet fever, gives a rate of 11.3 per 1,000 or eight times the rate in the regular nurses who were Dick tested and immunized.

SUMMARY

1. Of 690 students admitted to the Central School of Nursing of the University of Minnesota from 1929-1933, 314 or 45.5 per cent showed a positive skin test, indicating susceptibility to scarlet fever on admission.

2. The prevention of scarlet fever among student nurses by giving the Dick test to determine susceptibility and by the immunization of susceptibles has proven effective wherever used.

3. Reactions occur in about 10 per cent of those immunized. The majority of the reactions were mild and in no cases were they serious.

4. No case of scarlet fever has occurred in student nurses in the Central School of Nursing

among those who had negative skin tests or who were immunized with five doses of scarlet toxin, with the exception of a case in a student nurse who had had scarlet fever in childhood, whose Dick test was negative and who, therefore, had not been immunized. One case out of 690 nurses gives a rate of 1.4 per 1,000.

5. During the same period, there were seven cases of scarlet fever in a group of 619 affiliating nurses who had neither been Dick tested nor immunized. This gives a rate of 11.3 per 1,000, eight times the incidence in the regular nurses who had been tested and immunized.

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The Diagnostic Value of Arteriography*

With Report of Two Cases

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WELL advanced disturbances of the peripheral arteries are usually easily recognized by experienced examiners, for the diseases at this stage are of sufficient extent and duration to produce signs and symptoms known to be characteristic of certain pathologic processes. It has been emphasized before that about 85 per cent of diseases of the peripheral arteries can be correctly diagnosed after good histories have been taken, and the patients⁶ thoroughly examined. This percentage of correct diagnoses of peripheral arterial disease can be increased somewhat by methods of studying the circulation indirectly, such as examination of the capillaries of the nail fold, determination of the surface temperature of the parts involved, response of the temperature to systemic fever, and response of the color

of the extremities to changes in posture. There remains a comparatively small group of cases in which visualization of the peripheral arteries is an extremely important diagnostic aid. Although such a procedure is relatively unimportant when the entire subject of diagnosis of diseases of the peripheral arteries is considered, it may occasionally offer the major or indeed the single hope of recognition of the disease. In addition, arteriography gives information regarding the extent of the disease, the nature of the pathologic process, and the physiologic compensation for diminished flow of arterial blood as a result of occlusion of the main arterial passages. There seems little doubt that arteriography will add to knowledge of diseases of the arteries in much the same way that roentgenologic examination has added to knowledge of disease of the stomach.

The technic for visualization of the peripheral

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arteries by injection of thorotrast into the lumens of the femoral and brachial arteries of living subjects, without incising the skin, has been described by us elsewhere.⁴ Thorotrast, as stated, is composed by weight of 19 to 20 per cent of thorium dioxide, and 16 to 19 per cent of a protective colloid.² When injected into the blood stream it is engulfed by reticulo-endothelial cells, from which it is liberated and excreted very slowly. The substance is an ideal arteriographic medium in our experience, with the exception that the effects of the prolonged deposition of it in the body are largely unknown. However, there are no reports of harmful effects of the inclusion of it in reticulo-endothelial cells of animals and human beings for as long as three and a half and two years respectively. Longer periods of observation are necessary before the final answer to this question can be given. The amounts which we use for arteriography of the upper extremities (5 to 10 c.c.) is only about 14 per cent of that used for visualization of the liver and spleen. Erickson and Rigler do not believe that such small amounts could cause any harm.

We are reporting two cases in which arteriography proved of great aid in diagnosis.

REPORTS OF CASES

Case 1.—A woman, forty years of age, a teacher, was admitted to The Mayo Clinic June 20, 1932. She had been in good health until six weeks before admission, when she noted diplopia associated with vertigo when using her eyes. Nausea and vomiting had occurred on three occasions. All of these symptoms were relieved by occluding vision of one eye by wearing a pad over it. One week after the onset of diplopia and vertigo the tips of all four fingers of the left hand became cold and blue. This state persisted for several days, without any significant change, and then gradually improved until the appearance of all of the fingers was normal, except for the tip of the left fourth finger, which became black and involved by dry gangrene. Mild pain was present in all of the fingers which had been discolored, but was more severe in the index and little fingers. Superficial phlebitis had never been present. The diplopia, vertigo, nausea and vomiting disappeared as the color of the fingers improved. The patient had never used tobacco.

The essential physical findings were as follows: bilateral nystagmus on looking to the right and left; absence of pulsation of the left ulnar artery, with a positive compression test,¹ and dry gangrene involving the tip of the left fourth finger. All the peripheral arteries, with the exception of the left ulnar, pulsated normally. Laboratory data, including the serologic test for syphilis, determination of hemoglobin, enumeration of erythrocytes and leukocytes, and analysis of the urine disclosed nothing of significance.

Arteriography was carried out by the injection of thorotrast into the left brachial artery. The information gained from this procedure was unequivocal; occlusion of the lower ends of the ulnar and interosseous arteries, of part of the superficial palmar arch, and of many portions of the digital arteries was seen (Figs. 1 and 2). The diagnosis was chronic occlusive arterial disease (thrombo-angiitis obliterans).

Comment on Case 1.—An occlusive arterial disease of the inflammatory type (thrombo-angiitis obliterans) was suspected in this case. However, definite evidence of such a disease, aside from absence of pulsation in the left ulnar artery, was entirely absent. Arteriography in other cases has shown that ulnar arteries may be congenitally malformed and pulsations can be absent in the situation in which they are usually found. Thrombo-angiitis obliterans affecting women is rare (1 per cent of about 1,000 cases)⁸ and only slightly less rare among persons who do not smoke (1.5 per cent of 1,000 cases).⁵ Both of these observations militated against the diagnosis of thrombo-angiitis obliterans in the case under consideration. These facts, and the absence of a history conclusively that of thrombo-angiitis obliterans, made the diagnosis of such a condition inferential at the best when the ordinary methods of diagnosis were used. Arteriography allowed the diagnosis to be made.

Case 2.—A Dutch postmaster, aged forty-nine years, had had multiple amputations of both legs because of gangrene and non-healing incisions. The left leg had been amputated through the knee joint and the right leg amputated above the knee fourteen and nine years, respectively, before his admission to The Mayo Clinic in August of 1933. Nine years previously, ulcers on the second, third, and fourth fingers of the right hand had healed in three weeks. Aching had been persistent in the right hand and forearm since this time and in the left hand and forearm for six years. The hands had become cold easily in the winter time.

On physical examination pulsation in the femoral arteries was absent. The radial and ulnar arteries pulsated normally. When the right hand was opened after tight clenching and simultaneous occlusion of the ulnar artery by pressure of the examiner's thumbs,¹ the color returned in an abnormally slow manner to the ulnar side of the hand and to the fourth and fifth fingers. Repetition of the procedure with compression of the radial artery made the normal color return in an abnormally slow manner to the thumb, second and third fingers, and to the radial side of the hand. Complete neurologic examination gave negative results. Laboratory studies for the value of hemoglobin, enumeration of leukocytes and erythrocytes, urinalysis, and a serologic test for syphilis gave essentially negative results. Roentgenologic examination of the cervical spine disclosed a rudimentary cervical rib on the right.

An arteriogram was made using thorium dioxide sol as the contrast medium and by injecting it into the right brachial artery. Roentgenograms gave evidence of early involvement of the ulnar artery at the wrist,

clusive in view of the fact that none of the usually palpable arteries at the wrists was occluded. To be sure, the compression test on the radial and



Fig. 1. Arteriogram in a case of thrombo-angiitis obliterans. The arrows indicate the points of occlusion of the ulnar, of the interosseous, and of one of the digital arteries and of the superficial palmar arch. The irregular, patchy filling of the artery along the medial side of the fourth finger indicates organic disease with occlusion of the lumen of the artery.

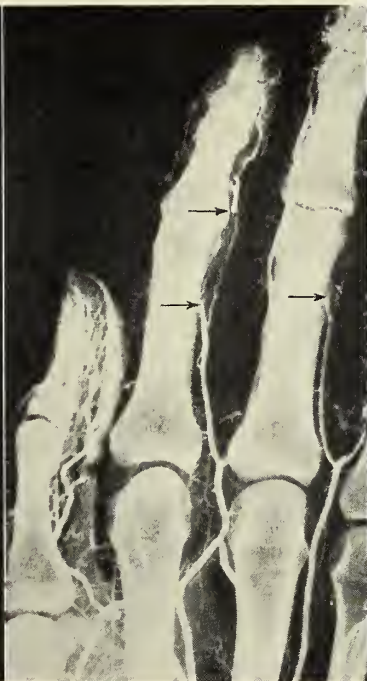


Fig. 2. An enlargement of part of Figure 1. The digital arteries along the thenar side of the index finger and in the distal portion of the ulnar side of the middle finger have been occluded by the disease. A segment of the digital artery along the medial side of the index finger has been occluded and the distal and proximal unoccluded parts of the artery are connected by a small collateral artery which seems fairly well to fill the function of the occluded segment.



Fig. 3. Arteriogram in a case of thrombo-angiitis obliterans. The irregular contour of the ulnar artery near the end of the ulna, almost complete occlusion of the distal portion of the radial artery, and complete occlusion of the middle portion of the palmar arches represent the primary, secondary, and tertiary phases, respectively, of thrombo-angiitis obliterans. The collateral circulation is increased in the radial side of the hand.

almost complete occlusion of the distal portion of the radial artery, and complete occlusion of the middle portion of the palmar arch (Fig. 3). These findings were considered by us to be characteristic of thrombo-angiitis obliterans.

Comment on Case 2.—As in Case 1 the history of trouble in the hands was not sharply characteristic of arterial disease. The assumption was logical that thrombo-angiitis obliterans involved the hands, inasmuch as the patient apparently had lost both legs because of this disease. It has been demonstrated pathologically that thrombo-angiitis obliterans may exist without clinical evidence of occlusion of the usually palpable arteries.³ In such circumstances the clinical diagnosis is usually based on previous experience and on inference. Thrombo-angiitis obliterans was suspected in the case under consideration but the clinical evidence for such a diagnosis was incon-

clusive in view of the fact that none of the usually palpable arteries at the wrists was occluded. To be sure, the compression test on the radial and

GENERAL COMMENT

We do not wish to magnify the diagnostic value of arteriography of the peripheral vessels. In most instances simpler procedures are entirely adequate. However, in certain instances, exemplified by the two cases reported, arteriography seems essential for a correct diagnosis. The procedure seems to us to be of much wider application than yet has been made of it. Knowledge regarding fundamental pathologic

and physiologic processes in the various diseases of the peripheral arteries probably could be obtained by use of the method. Investigators have been handicapped heretofore by the fact that only the terminal processes of the diseases could be investigated; that is, tissue was available for study only following amputation necessitated by the presence of gangrene, which is the end phase of the disease. The present method of study represents a distinct advance, and from this standpoint is deserving of wider use.

CONCLUSIONS

Two cases of peripheral vascular disease are presented. In each instance the ordinary methods of examination gave inconclusive information. The correct diagnosis of thrombo-angiitis obliterans was based almost entirely on arteriography, using thorotrast as the contrast medium.

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The Evolution of Tuberculosis in the Human Body*

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TUBERCULOSIS stands unique among the diseases which afflict man, in that two infections are required for the production of the complete clinical and pathological picture in all its varied possibilities. Tuberculosis of first infection is always acquired from without, whereas the reinfection forms of the disease may arise from endogenous or exogenous sources. These two general types of tuberculosis are rather distinct and dissimilar conditions.

Initial infections with tubercle bacilli may find simultaneous lodgment in single or multiple, adjacent or remote regions of the body. The invading organisms probably never remain entrapped exclusively within the confines of the focus of

primary implantation, regardless of where it is located. Certain of these bacilli or their progeny either migrate promptly or are carried in leukocytes through communicating lymph channels to lodge particularly in one or several of the regionally related lymph nodes, producing metastatic lesions there, which, together with the primary focus, collectively comprise the primary complex of Ranke. The wide extent to which metastatic implantations of bacilli may be distributed throughout the body in certain patients is indeed striking. In most cases of tuberculosis of first infection, the extent of disease in the lymph node component of the primary complex, exceeds that present at the site where the bacilli first lodged, and in certain instances the preponderance of lymph node disease may be tremendous. The lymph glandular system of the body thus is the great common repository for

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the initial infective dose of tubercle bacilli and their progeny.

As determined by the location of the focus of first infection, several forms of primary tuberculosis are recognized, of which the pulmonary and abdominal types predominate. The general clinical picture of tuberculosis of first infection, and the stages of evolution through which the condition passes, however, are fairly uniform irrespective of where the disease is situated.

In the great majority of instances, the symptoms are quite unobtrusive, and patients often remain ignorant of the fact that primary tuberculous infections have occurred, until positive tuberculin reactions disclose the truth of the situation. Occasional patients are seen, however, with a high, irregular and persistent fever, accompanied by toxemia, cough, stridor, cyanosis, abdominal distress, anorexia and loss of weight. It is rather characteristic of severe initial infections for symptoms to appear with greatest intensity in the early stage of the disease and to subside gradually in the course of time. In this respect, tuberculosis of first infection differs distinctly from reinfection types of the disease, for in the latter condition symptoms start insidiously as a rule but tend to increase in severity later. In general, however, the primary disease tends to be benign, and the majority of the acutely ill cases recover if separated promptly from further contact infection. Infants and children resist and bring, severe as well as mild, primary infections under control, so remarkably well that deaths from initial infections as they commonly occur in ordinary human contact experiences are exceptional at all periods in life.

The stages of evolution through which the lesions of primary tuberculosis customarily pass, may be followed by means of serial x-ray studies on patients with conspicuous primary pulmonary infiltrations. In such cases, the initial stage of the disease is revealed as rather homogeneous and dense appearing pneumonic consolidations which may be single or multiple and do not tend to be located in the subapical portions of the lung as is so characteristic of phthisis. The infiltrations commonly persist unchanged for months, and are associated with pleural effusions in appreciable frequency. Eventually the diffuse lesions and effusions begin to resolve slowly, and after a period of approximately two years or longer, they have either disappeared completely or have been

replaced by relatively insignificant fibrotic or calcified scars. Accompanying this gross reparative process in the lung similar regressive changes

CHART I. GENERAL TREND OF EVOLUTION OF TUBERCULOSIS OF FIRST INFECTION

Primary focus → Lymph node lesions

Primary complex

Location any part of body,
usually in lung or in
abdomen



Lesions acutely inflammatory at
first, but not demonstrable during
life in 75 per cent of the cases



Later, lesions slowly retrogress



Fibrosis or calcium deposits appear



Calcium deposits tend to undergo absorption

occur in the metastatic foci of disease in the regionally related lymph nodes, whereby acutely enlarged glands slowly recede in size and become calcified. Retrogressive changes, identical to those mentioned above, occur in practically all cases of primary tuberculosis whether heavily or lightly infected, but on a scale proportional to the size and extent of the lesions present in the individual patient. This is true irrespective of where the primary tuberculous disease is located. These gross changes can not be observed during life when the lesions are situated in extra-thoracic portions of the body. In these locations (abdomen, cervical region, etc.), however, the calcified stage of the disease is revealed frequently by x-ray examinations.

The general trend of the stages of evolution of lesions of primary tuberculosis is regressive; that is, the infiltrations subside to be reduced ultimately to relatively small fibrosed or calcified scars. In this respect, primary tuberculosis differs from reinfection types of the disease, for in the latter condition there is a more marked tendency for the pathological process to spread and to result in a progressive destruction of

endogenous reimplantations of bacilli transported through vascular channels or otherwise from pre-existing primary foci of disease. The new metastatic lesions are not inclined to recede and to calcify or fibrose with the regularity characteristic of tuberculosis of first infection, but tend more often to result in progressive necrosis of tissue. Thus these various extrathoracic forms of tuberculosis of reinfection, in common with phthisis, show a tendency to be destructive.

Of patients who have experienced a primary tuberculous infection and became sensitive thereby to tuberculin, approximately 6 to 8 per cent die eventually from some one of the various reinfection types of tuberculosis, and many others develop tuberculosis of reinfection but bring the disease under control. In certain forms of tuberculosis of reinfection (miliary tuberculosis, tuberculous meningitis, etc.) the bacilli received in the first infection dose or their progeny are directly responsible, as a rule, for fatal or destructive type of the disease which developed months or years after the initial implantation of organisms occurred. In certain other reinfection types of tuberculosis (phthisis particularly), reinfections undoubtedly are derived from exogenous sources with considerable frequency. Since these serious and often fatal reinfection forms of tuberculosis acquired from endogenous or exogenous sources develop exclusively in patients who are sensitive to tuberculin and whose bodies harbor foci of primary disease, it seems logical to look upon an initial infection with tubercle bacilli as a detrimental liability, rather than beneficial asset. Without doubt, the first infection opens the door to the path followed by tuberculosis as it passes through its various

stages of development in man. The general trend of the evolution of the disease in the human body is portrayed schematically, with the omission of certain details, in Charts I and II.

CONCLUSIONS

1. Tuberculosis of first infection is present in all patients who react positively to the tuberculin.

2. Regardless of where the disease is located, and irrespective of the extent of pathology present, or the patient's age, primary tuberculosis tends to be a benign disease as a rule.

3. The evolution of tuberculosis of first infection is characterized in general by successive stages of retrogression, whereby acutely inflammatory lesions, whether large or small, tend to resolve, to be replaced in time, by relatively small fibrotic or calcified scars. This process requires approximately two years for gross completion as a rule.

4. Reinfection types of tuberculosis which include phthisis, miliary tuberculosis, tuberculous meningitis, etc., are due to endogenous or exogenous reinfections, and develop solely in patients who are allergic to tuberculin and whose bodies harbor foci of tuberculosis of first infection.

5. The prognosis for the various reinfection types of tuberculosis is grave in general, and the evolution of these forms of the disease is characterized mainly by successive stages of progression or spread of the disease, whereby minimal lesions enlarge and cause ever increasing tissue necrosis.

6. On the whole, therefore, tuberculous lesions of first infection tend to recede, whereas, lesions of reinfection which develop in patients already allergic to tuberculin are inclined to progress.

Surgical Treatment of Pulmonary Tuberculosis*

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THAT surgical procedures are being more generally regarded as having a definite place in the treatment of pulmonary tuberculosis is evidenced by the constantly increasing number of patients who are treated in this manner. There is no doubt that surgery has been one of the most important factors in decreasing the death rate and the morbidity of this disease in the last twenty years.

The chief problems in the treatment of pulmonary tuberculosis are to make the diagnosis early, and to institute adequate treatment immediately. The basic treatment of the disease is rest, rigidly supervised and carried out in a sanatorium under a well regulated medical regimen. In many cases in which the diagnosis has been made early, cure can be effected by this conservative type of treatment. Unfortunately many patients do not present themselves for examination early in the course of the disease and the diagnosis is not established until the lesions are fairly well advanced. In these more advanced cases rest in bed often does not quiet the function of the lung sufficiently to permit healing. It is in this group that surgical intervention is indicated to give enforced rest to the lungs by immobilization and collapse of the diseased tissues. It is impossible to estimate definitely the length of time that conservative measures should be carried out, as this depends on the healing response in individual cases.

Surgical treatment should be instituted in cases in which a well regulated regimen in a sanatorium has been followed and in which healing has been slow or failed to take place within several months. Surgery should not be considered in order to hasten the cure in any case in which adequate improvement has been shown as the result of conservative measures, nor should it be delayed in cases in which improvement is not shown within a reasonable period, as often the simpler operative procedures will effect cure in the early

cases which, if permitted to progress, would require much more extensive and hazardous operative treatment later.

The selection of cases for surgical treatment demands the close coöperation of clinician and surgeon, and after study of the clinical progress of the disease. The type most suitable for surgical treatment is that in which the disease is proliferative or fibrous, rather than exudative; in the former type an attempt is made to encapsulate the lesion by the formation of fibrous connective tissue, and this process will be greatly aided by surgical intervention. The surgical treatment being carried out at present is an indirect type in which the diseased tissue is not removed. The chief object of all surgical procedures is to produce pulmonary collapse and to put the lung at rest. The collapse should be sufficient to promote drainage of abscess cavities and enough compression to produce approximation of their walls; this permits healing and the resulting fibrosis necessary to obliterate the lesions. There are many explanations of the general beneficial effects on the patient and the process of healing of the tuberculous lesions following collapse which involve the question of immunity as well as mechanical compression of the pulmonary tissue. The latter produces stasis of lymph and hyperemia in the parenchyma of the quiet lung; these factors are conducive to the growth of fibrous connective tissue which encapsulates the diseased areas.

The type of operation to be instituted depends on the condition in each case. It was formerly thought that operation was advisable only in cases of unilateral involvement, but in recent years excellent results have been obtained in cases in which the disease in the opposite lung was moderate. In many cases it is advisable to institute temporary surgical measures and to observe the result obtained. The subsequent course may indicate the advisability of the reestablishment of function of the lung, or the institution of another form of treatment. The more common types of surgical treatment utilized for pul-

*From the Division of Surgery, The Mayo Clinic, Rochester, Minnesota. Read before the Trudeau Society at the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 22, 1933.

monary tuberculosis in the usual order of frequency of use are artificial pneumothorax, operations on the phrenic nerve, thoracoplasty and extrapleural regional pneumolysis.

The clinical course of the disease can be closely followed by general physical examinations and subjective symptoms, but repeated roentgenologic examination of the lung in all cases aids greatly. In cases in which surgery is instituted, roentgenologic examination of the lung is of utmost importance. It may be deemed an absolute necessity, as it is only by this means that one can definitely determine the amount of pulmonary collapse which has been obtained and whether there are any obstacles to certain types of treatment, as well as to determine the progress of the lesion.

If temporary collapse of the lung is desirable, only those procedures which do not interfere with the bony framework of the wall of the thorax are indicated, such as artificial pneumothorax and operations on the phrenic nerve. If permanent collapse of the lung is deemed necessary it is accomplished by thoracoplasty, which consists of subperiosteal resection of a portion of the ribs. This procedure permits the soft tissues of that portion of the thoracic wall to fall inward and collapse the underlying diseased pulmonary tissue. The dimensions of the thoracic cavity are lessened, and this is maintained by applying external pressure until new bone is formed from the periosteum of the ribs that are removed. The amount and situation of the ribs to be resected depend on the type, extent and situation of the diseased parenchyma of the lung.

Artificial pneumothorax is the oldest and most common method employed to compress the diseased lung. The method is most useful in early unilateral disease in which the pleura is not adherent, but it may be used in bilateral lesions in association with other surgical procedures; it is one of the most efficient means of controlling intrapulmonary hemorrhage. Collapse by this method is easily accomplished, and in cases in which it can be utilized the collapse is the most complete. It also has a definite advantage over other methods in that the amount of collapse can be controlled.

Various gases have been utilized for introduction into the pleural cavity but filtered air is probably the most satisfactory, as it carries less risk of complications. Great care should be ex-

ercised in the introduction of the air, particularly when lesions are in the early stage, and it should be done under the guidance of manometric readings of the intrapleural pressure, or under fluoroscopic observation. If the introduction is not controlled in this way, air embolism, one of the most serious complications, may occur. If too much air is forced into the pleural cavity, there may be shifting of the mediastinum to the opposite side or a pulmonary hernia may occur.

It is generally believed that pleural effusion develops in approximately 40 per cent of cases; usually it is only temporary, and in most instances absorption will take place. In some cases, because of respiratory or cardiac embarrassment, aspiration will be necessary. There is always the possibility that serous effusion, which occurs in 5 to 10 per cent of cases, may become purulent. In some cases in which mixed infection has occurred with tuberculous effusion, symptoms of sepsis become so severe that drainage must be instituted. In most instances it is best to drain by repeated aspirations, but occasionally intercostal drainage may be necessary. Inasmuch as artificial pneumothorax constitutes a simple procedure, it is obvious that it would be indicated in the advanced cases in which the patients are very ill and cannot stand extensive surgical procedures. Unfortunately this is not possible in many cases because of the frequent occurrence of pleural adhesions associated with more extensive pulmonary lesions. These adhesions are the greatest obstacle to this form of treatment. In some cases the adhesions can be stretched gradually and a fairly satisfactory compression can be obtained ultimately. The adhesions are usually in the region which demands the greatest compression because it contains the more extensive lesions. In some of these cases, the adhesions can be cut with a galvanocautery by the Jacobeus-Unverricht method under the guidance of a thoracoscope. Matson has modified this method of closed intrapleural pneumolysis by using an electrothermic method with an endotherm having special electrodes which produce a high frequency current. Closed intrapleural pneumolysis is most useful in the string-like types of adhesions, but its application has been gradually broadened to include the wide fan-shaped type of adhesions by those who are skilled in the use of the thoracoscope. Pleural adhesions may be severed by open operation, thus cutting

into the pleural cavity through the posterior layer of the periosteum after rib resection. The adhesions are cut under direct vision with cautery or knife. This method has not gained universal favor, as the risk of complications, particularly empyema, is greater than by the closed method. In cases in which the adhesions cannot be stretched or cut by the closed method, it is probably best to select some other type of collapse.

Operations on the phrenic nerve producing temporary or permanent paralysis of the diaphragm are next in order of frequency and simplicity in the treatment of tuberculous lesions. Because of the excellent results obtained, such operation is gaining precedence as an initial procedure over artificial pneumothorax in many cases. The collapse and relaxation of the lung produced are not as great and do not have as much flexibility of control as that produced by artificial pneumothorax. In the temporary paralysis of the diaphragm caused by crushing the nerve, the diaphragm will remain paralyzed from three to six months before the nerve regenerates, with reestablishment of the function of the diaphragm. When it is desired to paralyze the diaphragm permanently, the surest and safest procedure is to dissect 3 to 5 cm. of the main branch of the phrenic nerve, including the accessory branches. Interruption of the phrenic nerve can be most widely applied in early lesions and in soft walled cavities in which only moderate relaxation of the lung is necessary. In some cases of bilateral involvement operations on the phrenic nerve on the side most extensively involved, may be followed by improvement or complete arrest of the lesions on both sides. The operation was originally suggested and used for basal lesions, and the results obtained were so satisfactory that it has been used for fairly well advanced apical lesions and cavities with excellent results. The operation is often used as a preliminary procedure to the more extensive procedure of thoracoplasty. The improvement following this preliminary operation has been found so marked that the more extensive operation was not deemed necessary. The condition in these cases should be closely observed because if the lesions are extensive there may be a false sense of security in the immediate improvement following interruption of the phrenic nerve, and in some of these cases the contralateral lung may become involved, which will make further

surgical treatment of thoracoplasty extremely hazardous or impossible. The disease might not have progressed had the more complete collapse by thoracoplasty followed the preliminary procedure. There has been a tendency in recent years to be more conservative in operating on the phrenic nerve, and temporary paralysis is coming more into favor as an independent procedure and also as a preliminary procedure to other operative procedures. I believe this to be the most useful treatment for early lesions when healing has been slow or stationary under conservative treatment, and it should be carried out before the disease shows signs of progressing.

Extrapleural pneumolysis may be used in selected cases in which regional collapse is desired; it is used chiefly for compression of apical cavities, but is rarely indicated, and the results are often unsatisfactory. The treatment consists in freeing the pleura from the thoracic wall and in filling the cavity thus made with paraffin, fat or muscle or an inflatable rubber bag. Operations of this type are not uncommonly followed by empyema.

In the more advanced cases in which there is no response to other forms of treatment, or in which it cannot be effected because of mechanical difficulties, the more extensive operative treatment of extrapleural thoracoplasty is indicated. The operation is most useful for unilateral lesions, and it may be partial or complete. Partial thoracoplasty may be indicated in selected bilateral cases. These operations are usually preceded by temporary or permanent interruption of the phrenic nerve and the extent of operation depends on the type and site of the lesion and the amount of relaxation of the lung necessary to collapse existing cavities. For the soft walled lesions and for cavities, moderate collapse is usually sufficient and can be accomplished by a paravertebral thoracoplasty with removal of posterolateral sections of the ribs in two or more operations, but I have performed the complete operation in one stage in selected cases with good results. In the more extensive cases in which large thick-walled fibrotic cavities are present, a more radical operation is necessary. It is essential to produce enough compression of the parenchyma of the lung to cause complete collapse of the abscess cavities. It is safer to carry out these operative procedures in three or four, or more stages. It is often necessary to remove the entire rib

over the region of the cavity. In apical cavities it is essential to remove a large portion of the upper ribs, and if the maximal collapse is necessary, to remove the ribs close to the spine, including a portion of the transverse processes. In a few extensive apical lesions resection of the anterior portion of the upper ribs, including the cartilages, and complete posterolateral resec-

tion of the rib are necessary. There are many variations in the technic employed. The most important consideration in performing thoracoplasty is to obtain sufficient collapse completely to obliterate all tuberculous lesions and cavities, because secondary operative procedures are usually more hazardous than the original operation.

Pre-operative Skin Sterilization: The Use of a Saturated Sodium Thiosulphate Solution in 70 Per Cent Alcohol to Prevent Iodine Burns

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THIS work was begun in 1922, at the University Hospital, the University of Minnesota, as the result of the several severe iodine burns following the iodine-alcohol technic of pre-operative sterilization. The publication of the article has been delayed because certain phases of the bacteriology of the problem needed to be worked out, and I was not in a position to do that until recently when the kind help of Drs. W. P. Larson and Owen Wangenstein, respective heads of the departments of Bacteriology and Surgery at the University of Minnesota, was obtained. Repeated requests for information relative to the use of this skin preparation have come to me, and recent presentation of the material before the Hennepin County Medical Society has afforded the incentive to prepare the material for publication.

The method herein described has been adopted by many of the large hospitals in the United States and is the method of choice of numerous surgeons. The number of cases in which this method has been used with success during the past nine years is impossible to compute. Suffice it to say that it has met with an enthusiastic response wherever it has been used.

The iodine and alcohol technic used in the preparation of a field of operation is now the most generally used of all methods of skin sterilization. It is quick in action, kills bacteria very rapidly, and leaves the field dry. However, this technic has its drawbacks. These drawbacks

are indeed so great in certain cases that an increasing number of surgeons are discontinuing the use of iodine and are relying on other methods of skin sterilization.

The disadvantages of iodine are as follows:

1. Severe dermatitis in patients who have an idiosyncrasy for iodine compounds. These rashes often become vesicular and seem to be easily infected, causing ugly cicatrices and hypertrophic scars that are often painful as well as disfiguring.

2. Formation of fumes that are especially irritating to the upper respiratory tract and eyes. These fumes contain ethyl iodide and hydrogen iodide. Ether anesthesia increases this drawback.

3. Metabolic disturbances through absorption of iodine in certain cases of thyroid dysfunction, namely, non-toxic adenomatous and benign colloid goiters. These two types may degenerate into toxic forms after administration of iodine in large amounts.

4. Increased danger of peritoneal adhesions. Iodine that comes in contact with the peritoneum is known to cause an irritation that tends to produce adhesions. The presence of iodine in operating field increases the danger of adhesions.

Solutions of picric acid in water and alcohol have been used, and indeed with success by many surgeons. However, picric acid is a very toxic substance, not only to bacteria but to the human organism as well. Cases of poisoning from picric acid have been reported in the literature, and I

have observed a mild case of poisoning, with jaundice, gastro-intestinal disturbance, headache and dizziness.

Harrington's solution and modifications of acid mercuric chloride solutions are being used at present for skin sterilization. A solution of this type that best meets the need is 1-250 mercuric bichloride in 95 per cent alcohol that has been made 3 to 5 per cent acid with hydrochloric acid. This solution is in use by some with wide experience and who have seen rather disastrous results from iodine burns. Ninety-five per cent alcohol is known to have antiseptic action less powerful than 70 per cent alcohol, and mercury bichloride is known to be a slower acting antiseptic than iodine, which acts immediately as a bactericide. This solution also has the disadvantages that it is colorless and that spots may accidentally be left unpainted, whereas with iodine this is impossible.

In the last ten years at the University Hospital we have attempted to improve our skin sterilization technic. Tincture of iodine being the most satisfactory antiseptic agent we had for the purpose, we endeavored to keep it, but to try and rob it of its undesirable effects. It has been our custom to use 70 per cent alcohol to remove the excess of the iodine on the skin after it has dried, and it was this solution that was modified in an endeavor to neutralize the iodine. Ammonium carbonate, ammonium hydroxide and sodium bisulphide were successively tried, but either they were insoluble in 70 per cent alcohol or else would not neutralize the iodine. It remained for 70 per cent alcohol saturated with sodium thiosulphate to prove satisfactory. In the ninth edition of the United States Pharmacopœia it is stated that alcohol and sodium thiosulphates are incompatible, but by experiment it was found that the solubility of the anhydrous salt was practically 0.5 per cent. The salt as ordinarily purchased contains five molecules of water of crystallization, necessitating the weighing out of practically twice the theoretical amount. In addition we found that it was better to add an excess of thiosulphate to the alcohol to keep the solution saturated in varying degrees of temperature. Practically, therefore, we make our solution by adding 30 gms. of ordinary pulverized sodium thiosulphate crystals to 1,000 c.c. of 70 per cent grain alcohol. The excess of the salt will precipitate but will keep the solution satur-

ated at any temperature within normal ranges.

Tinker and Prince have investigated very thoroughly the various methods of skin sterilization and have found that by seeding the skin with cultures of *Bacillus subtilis* before attempting sterilization, that only the dyes, especially acriflavine, would kill the spores without injury to the skin. Unfortunately dyes are the bane of the laundry of a hospital and it is doubtful if they do the work any better than the method about to be described. I repeated Tinker's work and found that following sterilization of the skin I recovered spores of *B. subtilis*, from skin scrapings cultured in broth, in only about 25 per cent of cases. In view of the fact that spores of *B. subtilis* are everywhere in the air, in water, dust, etc., my findings were probably not any higher than contaminations produced by transferring any culture. *B. subtilis* is a fine organism to attempt to kill on the skin because it has such resistant spores, but it is so widespread that contaminations may easily reach the cultures in other ways than from the skin scrapings. My reasoning in using *B. subtilis*, a known non-pathogenic infectant, on the skin, was that, if I could kill *B. subtilis* spores without injury to the skin, *B. tetanus* and all other organisms would suffer the same fate. Accordingly I rubbed broth cultures of *B. subtilis* into the skin of patients and let them dry, before attempting to sterilize the skin. I then prepared the skin by washing with benzene which was allowed to dry, applying two coats of alcoholic tincture of iodine (3.5 or 7 per cent) and allowing this to dry, washing the skin with three or four sponges soaked in a saturated solution of sodium thiosulphate in 70 per cent alcohol and letting it dry. I then used a sharp sterile scalpel and scraped the skin at several spots, transferring the skin scrapings to tubes of ordinary broth. I then incubated the broth for several days and noted whether any growth appeared. It was pleasing to note that no growth appeared in any tubes for thirty-six hours, and only in 25 per cent of tubes after seventy-two hours.

I therefore believe it is justifiable to assume that our method gives the closest approach to skin sterilization that is available. It combines in one method all the desirable attributes of the other methods. The use of the colored tincture of iodine insures the covering of the whole skin area with no spots left untouched. The iodine is

completely removed leaving the skin clean and white. It insures that the skin has been gone over with antiseptic at least twice, once to apply the color, and again to remove it. There is no danger from iodine fumes, iodine burns or adhesions from exposure of the contents of the abdominal cavity to iodine left on the skin, and last but not least, the linen used is unstained and can be reused.

Technic of pre-operative skin sterilization.—The technic now in use at the University Hospital is as follows:

1. Shave (dry or with soap) the evening before the operation.

2. Scrub and wash with tincture of green soap for five minutes. (If hand or foot, scrub as surgeon does for operation.)

3. Wipe area with benzene on gauze.

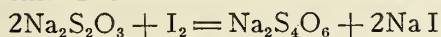
4. Wipe area with ether and gauze.

5. Apply sterile alcohol dressing held in place with sterile towel and binder.

6. On arrival in the operating room, paint the skin with two coats of 3.5 per cent tincture of iodine and allow to dry.

7. Sponge liberally over the painted area with a saturated solution of sodium thiosulphate in 70 per cent alcohol and allow it to remain a few seconds. Three to four sponges liberally saturated with the solution are used. This removes practically all the iodine and leaves the skin white. The skin is then dried with sponges and is ready for incision. This method has been in use at the University Hospital for ten years, and has proved very useful and has been accompanied by no bad results.

Mode of action of sodium thiosulphate.—It has been known for many years that iodine and sodium thiosulphate react to form colorless compounds, and this indeed is the basis of the standard methods of the titration used in iodine determinations. The reaction involved is as follows:



Sodium Thiosulphate and Iodine = Sodium Tetrathionate and Sodium Iodide.

Sodium tetrathionate is an unstable compound and readily breaks down, in the presence of water to sodium iodate, sulphur dioxide and hydrogen sulphide. These compounds are formed directly in the skin which has absorbed the iodine and a blanching of the skin results. There is a threefold antiseptic action, of iodine, sulphur dioxide and hydrogen sulphide. Since the reaction is intra-cellular and interstitial, a marked antiseptic action is to be expected. Sodium thiosulphate itself is a bleaching agent and contributes to the general antiseptic action. The skin is noticeably blanched and a faint odor of sulphur dioxide and hydrogen sulphide is perceptible. The final products of the reaction are non-toxic. They remain on the skin in a small part but are mostly carried away in the cleansing sponges. The result is a clean skin, that will not be burned.

Action on known cases of idiosyncrasy.—Several persons with known idiosyncrasy to iodine have been tested with this solution to see if they would be irritated. They consented to be tested with reluctance because iodine had always burned them severely. The skin was treated as outlined previously and observations at intervals following the treatment showed not the slightest harmful results.

CONCLUSIONS

Skin sterilization by the ordinary method of tincture of iodine and alcohol sometimes leads to bad results, due to burns, upper respiratory irritation, metabolic effects and peritoneal adhesions.

2. Substitutions now in use are not wholly satisfactory.

3. A saturated solution of sodium thiosulphate in 70 per cent alcohol sponged liberally over a field painted with tincture of iodine will keep the field sterile and yet neutralize the iodine.

4. The end products of the reaction are non-toxic to individuals known to have an idiosyncrasy to iodine.

The Treatment of Artificial Menopause*

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SINCE time immemorial woman has been subject to the tribulations and mental aberrations characteristic of the period which is commonly termed the climacteric or menopause. The rather gradual onset of these symptoms at the close of reproductive life is considered to be the normal sequence of events, but is nevertheless an exceedingly trying period for many women. The rapid precipitation of the menopause by the surgical removal of the ovaries often accelerates this transition and thus increases the intensity of the readjustment which the individual must undergo.

The manifestations of the artificial or surgical menopause are occasionally so marked as to simulate a mental imbalance or a morbid state. The usual symptoms are hot flashes followed by cold chills, vertigo, paresthesias, emotional instability, insomnia, restlessness, increased irritability and a melancholy attitude. The above symptoms coming on rapidly are very depressing to the young woman and somewhat less so to the older woman near the menopausal age. The clinical picture, although showing slight variations in the individual case, is quite characteristic.

In the past this condition has been treated with mild sedatives, suggestion and ovarian extracts. The latter we now know to have very little or no value except their placebo effect. This past experience has taught us that it is not the gland substance but the specific hormone which must be used intelligently if any improvement is to be obtained.

Zondek, Mazer and other competent observers hold the view that the menopausal symptoms which are vasomotor in character, such as hot flashes, free perspiration, chills and vertigo, are attributed to the lack of estrin influence upon the autonomic nervous system. That they may be influenced by a secondary malfunction of the adrenals and thyroid is not denied. The present available information, however, points to the fact that the deficiency of estrin is the underlying etiologic factor.

Due to the recent advances in endocrinology we now have available the pure standardized hormone of the ovarian follicle, known as folliculin or estrin. Allen has given the name of theelin to this hormone in its pure crystalline form. Through the research work of numerous investigators this estrogenic substance has been isolated from a number of sources, including the graafian follicle, corpus luteum, placenta, human blood and urine, vegetables, yeast, petroleum and lignite. Aside from the property of allaying hyperexcitability of the autonomic nervous system incident to the menopause, this hormone, which I prefer to call estrin, has as its main functions the stimulation of growth and vascularization of the genital tract, the early development of the endometrium and apparently also it plays a rôle in the maintenance of a normal basal metabolic rate. Earlier in life estrin is responsible for the development of secondary sex characteristics and the trophic sex changes which occur in the young female before puberty.

The commercially available products of estrin are standardized in rat units, one rat unit being the minimum quantity, which, when given in three divided doses at four-hour intervals, will produce estrus in the castrated rat. Three commercial preparations have been used in this series. They are as follows: Theelol—manufactured by Parke, Davis and Company and marketed in sealed kapseals each containing fifty units; Amniotin oral—manufactured by E. R. Squibb and Sons and marketed in corn oil solution, each drop of which contains ten units; Progynon, a foreign preparation manufactured by Kohlbaum and marketed in tablets of forty-five units each.

Unfortunately these products are relatively expensive at the present time, but it is hoped that with simplified methods of extracting the hormone and rapidly increasing use, the cost will soon be materially reduced.

I am indebted to Parke, Davis and Company and to E. R. Squibb and Sons for supplying their respective estrin products for clinical trial. This series is too small to draw any very definite con-

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clusions from, but certain impressions have been obtained which I wish to discuss briefly.

The first point has to do with dosage. The only criterion is the subjective relief which the patient experiences. Sufficient hormone to control the symptoms usually requires the administration of 100 to 200 rat units daily. Since the hormone is eliminated rather rapidly, it is necessary that it be administered in frequent doses. Few patients will coöperate to the point of coming to the office daily or even every second or third day for hypodermic injections, and for this reason the oral administration is obviously the more practical.

Secondly, the optimum time to start the administration is immediately after removal of the ovaries, beginning with a small dose which is gradually increased until the symptoms are controlled, after which the dosage may be gradually decreased. If this procedure is carried out, the patient will hardly be conscious of the transition following surgical castration. Just how long the treatment must be continued we do not know. Indications are that there will be considerable variation according to the individual case.

In the third place, a few women who were operated for removal of both ovaries one or two years before the administration of estrin did not obtain the desired relief of their menopausal symptoms. This was especially true of patients in the older age group. The reason for this is not clear, but apparently some change has already taken place. It is possible that a process of readjustment has been made in the remaining endocrine glands or on the part of the body as a whole to compensate for the deficiency or loss of estrin.

Thus we see that the treatment of surgical menopause begun immediately after castration will produce gratifying results when sufficient estrin is administered, but treatment started a year or more after removal of the ovaries is rather discouraging in some cases.

In conclusion, I wish to make two points which I believe to be pertinent to this condition. The first concerns the conservative attitude toward removal of ovarian tissue. If the surgeon is able to conserve a portion of one or both ovaries without future danger to that patient, he has already treated her for the surgical menopause which was sure to follow if both ovaries were totally excised. She has received better treatment than she possibly could have had by substitution therapy with estrin. However, if it is imperative that the gonads be completely removed, then we may, through the administration of standardized estrin products, alleviate to a large degree, and in some cases completely, the distressing symptoms of the surgical menopause.

THE DULUTH CLINIC.

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The Presenium*

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THE presenium is that period of life immediately preceding the age of senescence. Man generally reaches his peak in the early fifties and from then on his course descends gradually into senescence. This period is also called that of involution, although the involutionary processes are not confined to this stage of life. It is, however, that period which Warthin called the major involution during which the processes of destruction and atrophy of tissues overbalance those of repair.

The phenomenon of involution is present even before birth. It is witnessed in the disappearance of the tail of the spermatozoan, the Wolffian bodies, the gill slits, and the ductus arteriosus. At birth the placenta is a senile structure and later the thymus meets the same fate. Evolution and involution are thus constantly seen occurring simultaneously. When an organ reaches its full development and ceases to be of value, nature brings on the involutionary processes and, if necessary, removes it so that the organism as a whole may mature unimpeded. Finally, it in turn reaches maturity and after accomplishing its biological purpose the presenium is reached.

From a biological standpoint our function in life is to perpetuate and preserve our kind. In this manner nature insures the immortality of the race. It might be said that we live for the next generation. With the independence of the younger generation established, the "inexorable law" states that we shall recede from the stage, make way for the younger and more vigorous and, for the good of the race, finally disappear entirely from this life. In accomplishing, or attempting to accomplish, this difficult task, we are driven relentlessly forward by different distinctive urges. There are those that tend to the establishment of home and family; those that seek self-realization and attainment, and finally those that require satisfactory social relations with one's fellows. It is during this period that one

usually sees the fruition or failure of attainment of these goals. To the young man it is the time of life barely discernible in the haze of the future but which, he fondly hopes, contains the climaxing and successful fulfillment of his ambitions. To many, instead of the sailing in of the proverbial ship, it brings disillusion and disappointment. Even to the successful it frequently brings bitter disappointment and worry. For these reasons this period of life often takes the measure of the man.

It is difficult to say just when the major involutionary processes definitely begin. The initial functional appearance of this period is exhibited by presbyopia and the onset of sexual neurasthenia and chronic fatigue. The resiliency of youth gradually disappears. It is noticed that it takes longer to recuperate from physical exertion, and a decline in the aggressiveness of the individual sets in. Man does not grow old at once; the onset is insidious; the developing of the old age complex is slow; but once started the progress of the involutionary processes is inevitable.

From the forty-fifth to the sixty-fifth year is a critical period. Due to the advances in medicine more people are now reaching this age. For this reason, probably, we are witnessing a sharp increase of diseases that are prevalent in this period. This is especially true of cancer, heart trouble and arterio-sclerosis. Arterio-sclerosis is inherent in all involutionary processes. The same identical picture of atherofibrosis, loss of elastic tissue, occlusion or dilatation of vessels, deficient circulation, thrombosis or rupture appears in the involution of every organ. This happens in the placenta, the thymus, in the disappearance of the ductus arteriosus and finally the same process repeats itself in the brain. Many theories have been advanced to explain this phenomenon. Wear and tear of modern life, endocrine disturbances, hypertension, toxins, autointoxication and many other explanations have been proposed. Wear and tear of modern life cannot entirely explain this involution process as it does not fit in the picture of the minor in-

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volution. In light of our present knowledge we can only state that in all probability the major factors are contained in the hereditary elements of the germ plasm itself.

So far as preventing arterio-sclerosis, the old adage about picking your ancestors is as important as ever. It is thus easily understandable that vascular lesions are the most common organic conditions of the brain encountered after the age of fifty. Fortunately many people with advanced arterio-sclerosis are able to carry on and show no clinical symptoms of this condition. Although it is not in our power to prevent cerebral arterio-sclerosis yet it is a condition in which we can, as physicians, assume responsibilities with a definite amount of optimism. It is a condition which runs a protracted course without usually seriously interfering with the activities of the individual. The early symptoms have a tendency to come and go in the beginning. By regulating their activity, keeping them within their capacities and combating the depressive psychic effects frequently found, it is often possible to carry these patients through years of useful life. Moderate exercise, adequate rest, regularity, moderation as regards alcohol and tobacco, slight regulation of diet, a little medicine, and a lot of common sense are the means at our disposal in treating this affliction. As long as it is possible these patients should continue their avocations even if at a diminished pace. Many people enjoying fair health with this condition have been hurried into senility by premature retirement.

Apoplexy is frequent in the latter part of the presenium. It was formerly taught that brain hemorrhage was the proof of aging arteries. It is now known that infections or toxic infectious conditions of the vessel wall may bring this about even in the absence of arterio-sclerosis. It has been learned through experience that apoplexy may be the beginning symptom of an epidemic encephalitis. Where there are bilateral symptoms of paralysis and ocular palsies it is well to think of this condition. It is also important to remember that sudden apoplexies may appear in uremia, insulinism, brain tumor and beginning paresis. The vast majority of cases of brain hemorrhage with paralysis have a sudden onset of unconsciousness. This is not so true in thrombosis. In a case of apoplexy anything may be expected within the first twenty-

four or forty-eight hours. It is well to bear in mind that a sudden severe attack may have a better prognosis than one beginning lightly but subsequently showing increased drowsiness. If the stupor does not increase, or if the unconsciousness seems to be lessening, one is justified in being optimistic that marked improvement will take place.

When the secondary effects of arterio-sclerosis become so dominate that softening, gliosis or insufficient nourishment of the brain cells take place, psychic symptoms exhibit themselves. They are very similar to those of early senility and the two conditions often are combined. For this reason it may be impossible to differentiate them. Arterio-sclerotic insanity, besides showing the neurological signs of this condition, usually runs a more protracted course with more fluctuation in the early part of the trouble. It may take years before the psychic symptoms dominate the picture. However, instances will quite frequently be encountered when the development of the organic psychic syndrome may be quite sudden. I have seen this happen after an attack of aphasia and hemorrhage, and recently this condition was precipitated in one of my arterio-sclerotic patients following influenza. In these cases the circulation was probably just sufficient to nourish the brain cells properly, but the extra load and strain of these infections was too much for their vascular apparatus and as a result the secondary effects developed rapidly. When the psychic conditions dominate, it is important to know the mental capacities of the individual. This is necessary in order to intelligently supervise his activities and of great importance in the matter of making wills. Frequently the family physician, at times with reluctance, is forced to later testify in court regarding the individual's capacity in this matter. As long as it is feasible these patients should be kept occupied in some capacity, and only when they become dangerous to themselves, or others, or their conditions become unbearable in home surroundings, should they be committed.

Involution, fortunately, appears first in the form of psychical decline. The nervous system, like other organs, has a certain potential of its own in its development and decline. The rise and decline of functions and activities are present throughout life's span. Thus nutrition and metabolism begin their decline in the early years of life. Motility reaches its height at about the

twentieth year and levels off until around thirty, when it begins to recede. The reproduction curve reaches its height in the mid-twenties, declines through the thirties and becomes more or less quiescent after forty-five. The functions of the nervous system, on the other hand, develop more slowly. It does not develop by multiplication of cells, nor by the formation of new neurons. It develops by bringing more and more neural centers into action, by creating a wide range of responses to the environment and external stimuli and by opening up and developing new association paths. This development progresses from birth, through adolescence and it is possible of continuance even in the presence of involution in other spheres. Man does not reach his full mental or spiritual development until the mid-sixties.

We are not interested in the prolongation of life through the senile period of existence. We are interested, however, in the possibility of really living our allotted span by developing and maintaining the full functions of our nervous systems. It may seem presumptuous in presuming that some of the trials and tribulations of the presenium can be prevented. Arthur Sweeney used to write in his inimical style of this age. His short paper on "The Single Track Mind" was a philosophical masterpiece. He cited many instances of successful men, enjoying normal

good health, wealthy and prosperous from a material sense, whose existence was tolerable until the sixth decade. It was then that the crash came. They were hard working, sober, serious individuals, who had no vices, no diversions, were devoid of humor and had no time for the lighter side of life. They sowed no wild oats during their youth, had no time for sports and their perspective was limited. Their interests were confined in a single groove. They were successful and were frequently upheld as examples whom the youth of the community should emulate. During the sixth decade their test came. To many the fear of poverty entered their souls. The capacity of enjoyment had shrunk. Suspicion and apprehension dominated their emotions. They proceeded thus to the end.

To prepare for this period it is necessary to begin early. Development of association tracks early in life along different lines lays a broad foundation to build on in later life. Play and diversion are as necessary as work; even a few gentlemanly vices are an asset at times not to be despised. By thus developing our tastes and activities we are storing away treasures, the proceeds from which may later pay in tenfold and help us in the sixth decade to at least alleviate to some extent some of the trials and tribulations that may beset us.

The Use of Chloral Hydrate in Pediatric Practice*

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THERE is probably no branch of medicine in which drugs are used less than in pediatrics. In fact, they have come to play such a small rôle that there has been a tendency for pediatricists to become drug nihilists. There is no question that a healthy skepticism is a valuable asset, but we should not forget that there are certain drugs which are of definite value in the cure of disease or in the relief of symptoms. Chloral hydrate holds a high place among these drugs. It is well tolerated by infants and children and when used

in the proper dosage seems to be absolutely safe. The giving of it by rectum for the control of convulsions is so well known that I shall not discuss it. Rather, I wish to speak of some of the other conditions in which chloral hydrate may be used and in which it is usually of definite value.

I shall first speak of its use in the treatment, or rather in the relief of colic. Although today we realize that when an infant is suffering from colic, there is some underlying cause which we should find and correct, nevertheless to do so takes some time as a rule and often when we see

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a baby with severe colic, not only is the baby pretty well exhausted from pain and lack of sleep, but the father and mother are also worn out, nervously and physically.

Although the physician may know that there is no cause for worry and that, if he can have a few days to study the case, the colic can be corrected, nevertheless it is rather unfair to ask the parents and the baby to wait these days before any relief is given. Under these circumstances, chloral hydrate, given by mouth in one grain doses before each feeding, will in most instances give the infant immediate relief, and the whole family will be in much better condition, physically and mentally, to coöperate with the doctor in remedying the underlying cause of the difficulty. After a few days, when the cause has been found and corrected, the chloral can be discontinued.

We often meet the situation where a perfectly healthy infant or child has developed bad sleeping habits. This may be the result of improper training on the part of the parents, or it may follow some illness. Perhaps the best way to break the crying habit is to let the child cry it out for a few nights, but there are times when this is extremely difficult to do. The mother may be too tired or nervous to be able to do it, or the father may refuse to coöperate in allowing this drastic method, or, if the family lives in an apartment, it may be impossible to allow the child to cry for several hours, for several nights, without causing a riot on the part of the neighbors. We can often break the habit in such cases by giving chloral by rectum at bed-time for two or three consecutive nights, in a dosage sufficient to insure unbroken sleep.

Another condition in which chloral seems of definite value, is in the control of certain types of severe vomiting. One such condition is in the attacks which occur in cyclic vomiting of childhood. Another is in those cases of acute upper respiratory infection in which vomiting is the outstanding symptom and in which the child will sometimes vomit everything that is ingested, whether food or fluid, for several days. The vomiting in these two conditions sometimes assumes alarming proportions. Marked dehydration or even acidosis may develop. In the great majority of these cases, if chloral hydrate is given per rectum in sufficient amount to put the child to sleep and repeated if necessary at from four to six hour intervals so that he sleeps from

eight to twelve hours, he will awaken at the end of this time and the nausea and vomiting will have ceased. Obviously, in such conditions, the use of chloral hydrate is only an adjunct to the proper dietary regime and the proper administration of fluids.

Often, during the course of an acute illness, it is necessary to control extreme restlessness. If the restlessness is due to toxemia rather than acute pain, chloral given by rectum will usually give the desired result. For example, during the course of pneumonia, one often finds it of great value in keeping the child quiet and providing sufficient rest and sleep.

In the performance of certain diagnostic and therapeutic procedures with children, although it is not necessary to have the child anesthetized, the physician can do better work and the child can be relieved of apprehension and also of considerable pain if a hypnotic be administered in advance. Spinal punctures, blood transfusions and the injection of subcutaneous or intraperitoneal fluids might be mentioned.

Finally, I wish to call attention to some of the uses of chloral hydrate in surgery. Its value in the diagnosis of acute abdominal conditions has long been known, and because of its importance I am taking the liberty of emphasizing it again. Often one suspects an acute appendicitis but because of the apprehension of the child it is impossible to make a satisfactory examination. In these children, the administration of an adequate amount of chloral hydrate by rectum will soon cause them to relax so that they will no longer resist examination, but still will respond to pressure over the appendix, if it causes pain. Muscle spasm too is not eliminated by this medication.

Chloral hydrate is also of definite value in lessening the distress which children suffer following surgical operations. The first day after an operation is usually a nightmare to either adult or child, but I think it particularly so in the case of children, because they do not understand what it is all about and have the factor of fear added to the physical discomfort. If chloral hydrate is given per rectum at the time when a child first begins to awaken from an anesthetic, he will drop back to sleep for several hours, at the end of which time he will awaken with less nausea and discomfort. This procedure seems to be particularly effective after tonsillectomy. The marked difference in the convalescence following

this operation when chloral is given, compared to that which most children have when it is not given, has caused many to adopt its use as a routine procedure. Some order it to be given before the child is taken to the operating room and others have it given when the child starts to awaken from the anesthesia. It seems to me that the latter procedure is preferable as the effect of the chloral will thus last longer and is not likely to interfere with the accurate administration of the anesthetic.

I have found that, in order to get the desired results in the administration of chloral, it is necessary to give larger doses than are recommended in most textbooks. As previously mentioned, a dose of one grain by mouth, before feedings, will usually relieve the symptoms of colic in a

small infant under three months of age. To control convulsions or restlessness or to bring about uninterrupted sleep, the following amounts of chloral by rectum are usually required: five grains in infants under six months of age; from five to seven and one-half grains in babies from six months to one year; seven and one-half to ten grains from one year to two years of age and from ten to twenty grains in children two years and older. Even greater amounts are necessary to control severe convulsions in some instances.

Conclusions.—Chloral hydrate is a drug which can be safely used in pediatric practice. Its most important use is the control of convulsions; it is of definite value, either as an aid to diagnosis, or as a means of alleviating pain, restlessness or excess vomiting.

1251 MEDICAL ARTS BLDG.

Paralytic or Reflex Ileus

With Report of a Case of Fourteen Days Duration Following Simple Herniotomy

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FROM the etiologic standpoint, conditions resulting in obstruction to the continuity of the intestinal tract may be divided into three general groups: the mechanical, vascular and the nervous.¹¹ Those of mechanical origin are most common and include strangulations, volvulus, intussusception, strictures and neoplasms, while the vascular type results from such lesions as thrombosis, embolism, compression or injury to the mesenteric vessels. The third type, with which this paper is concerned, has been variously called reflex, adynamic, inhibition and paralytic ileus and is made up of those cases in which there is a complete absence of motility or propulsive power in the intestinal tract, but without any demonstrable organic lesion. Although there is no mechanical blockage present in the latter type, yet virtually one does exist since the bowel content cannot be moved on downward but is maintained totally motionless so that the result is identical to that of a complete obstruction.

Numerous causes of paralytic ileus have been

recorded in which there has been no discoverable intraperitoneal injury, among these being spinal cord injuries,⁶ pregnancy,⁴ functional disturbances,² pyelitis,⁴ dietary indiscretions,⁴ cardio-vascular diseases⁵ and many of unknown etiology. It is well known that the condition frequently follows in varying degrees any form of intra-abdominal trauma or may occur after any surgical procedure especially upon the intestinal tract. The pathology of this condition is not definitely known but presumably lies primarily in some form of trauma to the nerve endings in the peritoneum, resulting in disturbances to the nerve mechanism and consequent paralysis of peristalsis.

The condition is expected to be present temporarily after any major surgical procedure and it is usual that some degree of paralytic ileus does manifest itself, but if intestinal function is not soon recovered and definite signs of obstruction become apparent, the problem assumes a serious one and death may take place in a relatively short time. Due to the paralysis

of the intestinal musculature the downward progress of the contents is halted, and there is damming back of the gastric, biliary, pancreatic, and intestinal secretions along with any food which may have been ingested. Swallowed air,⁷ and to a less extent gas producing organisms, along with increasing amounts of intestinal contents, produce the distention which rapidly accumulates unless relief is obtained. This increase in intra-intestinal pressure impairs the circulation of blood to the mucosa of the bowel just as in other forms of obstruction, resulting in necrosis, fissures and gangrenous patches, thus allowing absorption of toxic products from the lumen of the bowels.⁸

There is ample proof that death is primarily not due to septicemia or peritonitis; these conditions may be considered more as complications than part of the original disease, since bacteria readily migrate through the diseased bowel wall or even through a perforation to produce such effects. Starvation, dehydration and demineralization are directly responsible for a fatal termination rather than toxemia, as proved by reintroducing the vomited material through an enterostomy tube into portions of the bowel which are normal.⁹

Early in the disease the bowel appears grossly normal but as distention increases the circulation becomes more impaired, and the glistening whitish color of the normal gut is replaced by a dull reddish hue which becomes darker and approaches black as gangrene supervenes. Blood is effused into the intestinal lumen rendering the content dark and foul smelling, and the amount of this material becomes enormous when the condition persists for any length of time.

In paralytic ileus the clinical picture of small bowel obstruction is present, with the exception that on auscultation of the abdomen there is complete absence of borborygmi, peristaltic rushes, metallic tinkles, and other evidence of intestinal movement; likewise there is absence of recurring sharp pain characteristic of intestinal colic such as is typical of mechanical or vascular obstructions. Early the differentiation from peritonitis is difficult but may be made on the basis of lack of fever, tenderness, and other signs of an infectious process, and in many cases from the fact that there has been

no contamination of the peritoneal cavity such as in the case reported in this paper. The first sign giving suspicion of continuation of the ileus following any surgical procedure, is the fact that two or three days postoperatively, when the patient should be showing evidence of resumption of intestinal activity, he is still unable to retain food or fluids by mouth. Meteorism gradually increases, no sounds are audible by auscultation of the abdomen, and the patient soon begins to look sick. In fatal cases the toxemia rapidly becomes more marked, and a varying degree of shock is present. Vomiting at first is with force but gradually becomes more of a regurgitation or a slopping over and the patient gulps up large amounts of black, foul smelling fluid. Pain is not a constant feature unless peritonitis is present. The blood pressure is low and the pulse weak, rapid and thready. The temperature is rarely elevated except late in the disease. The abdomen is distended but presents little or no evidence of intestinal activity, there is no visible peristalsis and none or relatively few sounds are heard on auscultation—the so-called “silent abdomen.” Urinary secretion is diminished, the patient soon becomes drowsy, cyanotic, comatose, and death may supervene. If enemas are given it is necessary to syphon them back as the bowel has no expulsive power.

Laboratory findings confirm the presence of dehydration, demineralization and alkalosis, which if allowed to continue will terminate fatally. The blood chlorides are diminished, the nonprotein nitrogen is elevated, and the carbon dioxide combining power rises markedly. These changes are identical to those occurring in complete duodenal fistula,¹⁰ indicating that loss of fluids and minerals are of the greatest importance. Early the leukocyte count remains normal or subnormal, but may rise depending upon the presence of dehydration and of inflammatory complications. The erythrocytes are frequently increased if dehydration is marked.

The value of the roentgenogram in paralytic ileus as well as in other forms of intestinal obstruction has been established. Flat plates of the abdomen with the patient either standing or on his side reveal the presence of gas in the small bowel, a condition which is distinctly abnormal; and any visible collection

of gas, such as the "fluid mirrors" in which air is layered over fluid, may be considered synonymous with intestinal stasis. The typical "ladder" patterns of large gaseous accumulations are seen late in the disease, but if continuous nasal catheter suction siphonage is maintained this is usually not present. Gas in the small bowel can be readily differentiated from the air normally present in the colon. Its presence in the latter location is evidenced by its filling the lateral borders of the abdomen, the long axis of the gaseous column is vertical, the walls of the colon appear thicker and the haustra can be visualized.¹²

The principles underlying the treatment of this condition are that of any form of intestinal obstruction, namely to restore the fluids, maintain the sodium chloride in the blood, relieve the distension by decompression of the bowel, and to combat the alkalosis. The introduction of a Levin catheter-tipped nasal tube into the stomach and the maintenance of continuance intra-enteric suction has been an especially invaluable adjunct in the treatment of this type of bowel obstruction.⁹ By means of this method, suction by water siphonage is continuous and it is frequently the case that more secretions can be removed than will come through an enterostomy. The bowel can be completely decompressed since the largest portion of intestinal gases originate from swallowed air.⁷ Gaseous distention is kept at a minimum, comfort of the patient is preserved, and the prognosis as to life is greatly enhanced without the necessity of surgical intervention. As the principal cause of postoperative distention is the swallowing of air combined with an inability of the bowel to expel it because of a more or less temporary ileus,⁷ the most logical method of treatment is prophylaxis. This is best accomplished by a continuous suction used with water at a height of 75 centimeters, thus cutting off the gaseous accumulation at its source.⁹ Water and chlorides must be supplied, and this is usually done by the administration of normal salt solution either under the skin or by vein. Gastric lavage empties the stomach, but to be of value must be carried out repeatedly, and consequently continuous suction as suggested is preferable. External moist heat to the abdomen, turpentine stupes, and

morphine in adequate dosage are other valuable measures. The latter drug has been shown to have no etiologic significance in the production of postoperative distention,⁹ nausea, vomiting and gas pains. Its constipating effect is not due to diminution in the tone of the intestinal musculature as is frequently assumed, but to inhibition of the defecation reflex and to an actual increase in the tonicity of the bowel. It is therefore advisable to use the drug in sufficient dosage to control pain.

Drugs intended to stimulate the gut are usually of no value and may even be dangerous. Pituitrin, physostigmine, acetyl choline, and so forth are unable to stimulate an already severely damaged nerve mechanism, and especially if there has been a surgical procedure on any portion of the gut, the use of these drugs is to be deprecated. This same fact holds true for the administration of drastic cathartics such as castor oil, croton oil and so forth, which may be given through the duodenal tube. The bowel is in no condition to respond to such stimulation and more harm than good will result until sufficient motor power has been recovered to facilitate elimination of the drug.

Spinal analgesia by the injection of procaine¹ has been warmly recommended especially when the drug is given in reduced dosage, and it should always be tried before the stage of shock has been reached. Results from its use however, are not constant but it seems that the good results overbalance its dangers.

It is of the greatest importance to differentiate paralytic ileus from obstructions of mechanical or vascular origin since in the two latter conditions early surgical intervention is imperative and in the former, medical management is in most cases indicated. Drainage operations such as enterostomy are not only valueless in inhibitive ileus because of the limited length of bowel which they decompress, but are even detrimental and dangerous since additional shock and peritoneal trauma are added to an already severely damaged mechanism. Transfusions of citrated or whole blood are of great value in instances in which the general resistance has become markedly lowered, or where there has been prolonged suffering, and occasionally this procedure will mark the turning point in the condition of the patient by its stimulating influence.

REPORT OF CASE

The patient, a man forty-three years of age, presented the typical history of an uncomplicated left inguinal hernia which had been present for eight or ten years. It had never been strangulated at any time and there had been no history of trauma. His past history as well as his family history were irrelevant. A typical Bassini type of repair was performed March 20, 1933, for an indirect inguinal hernia and no unusual features were noted at the time of the operation. Anesthesia consisted only of ethylene by the inhalation method; no ether was used at any time. The patient was awake by the time he was returned to his room and on the evening of the day of operation he started to take fluids by mouth. The following morning he stated that he was nauseated and he soon vomited several times, his abdomen gradually became more distended, hiccups were practically continuous and he became quite uncomfortable. Auscultation of the abdomen gave no evidence of intestinal activity. The next day the patient began to look toxic and a flat roentgenographic plate of the abdomen showed the typical appearance of small bowel obstruction with "fluid mirrors" and "ladder patterns." Continuous nasal suction with the Levin duodenal tube by means of water siphonage was started, and this almost immediately resulted in the evacuation of a large amount of gas and liquid secretions from the upper intestinal tract. Fluids and sodium chloride were supplied by the administration of 5,000 to 6,000 cubic centimeters of normal saline daily, both subcutaneously and intravenously. For five days postoperatively the patient remained in approximately the same condition, he appeared fairly well, the abdomen was not distended and a roentgenogram showed considerable improvement although there still was evidence of small amounts of gas in the small bowel. Daily auscultation of the abdomen showed no evidence of resumption of intestinal motility although distention was absent and the patient continued to be relatively comfortable. For nourishment glucose in 10 per cent concentration was given intravenously mixed with the saline. Blood chemistry values did not markedly deviate from the normal, the urea nitrogen varying from 27 to 35 milligrams, the carbon dioxide combining power 49 to 55 volumes per cent, and the blood sugar around 130 milligrams per cubic centimeters of blood. White cells numbered 14,500, the red cells 5.2 million per cubic millimeter of blood and the hemoglobin concentration was approximately 96 per cent by the Sahli method.

The nasal suction was discontinued at intervals by clamping it off for several hours at a time but when this was done all symptoms of obstruction soon returned. The twelfth day postoperatively, the patient was given a transfusion of 500 cubic centimeters of citrated blood and that same day there was slight evidence of return of intestinal function—borborygmi and metallic tinkles. Nasal catheter suction was discontinued for two hours out of every three and on the next day for two and a half out of every three,

while clear fluids were given by mouth. On the fourteenth day postoperatively, the tube was removed altogether. By this time the patient was able to expell an enema which was given while he was lying prone, and following this procedure gas was passed freely by rectum. Fluids, and later solid foods, were given by mouth, and twenty-four days after the operation he left the hospital in excellent condition. The hernia wound had healed completely without signs of infection and no drainage appeared. Complete study of the gastrointestinal tract with the roentgenogram three months later using barium both by mouth and as an enema showed no evidence of pathologic changes or stasis in the stomach, small intestine or colon. At present (August 1, 1933), he is in excellent physical condition, he carries on his regular work as a telephone linesman and he has fully recovered his normal strength. His bowel habits are now perfectly normal, just as they were prior to the operation.

SUMMARY

1. Paralytic ileus is a condition caused by factors of varied etiologic significance but chiefly by some form of trauma to the nerve endings in the peritoneum. It has been designated also the reflex, inhibitive, or adynamic type.

2. Ileus varying in degree and duration follows any major surgical procedure, especially that of the upper abdomen or upon any portion of the intestinal tract. Along with the presence of swallowed air, this stasis results in the production of distention, nausea, vomiting and gas pains. These symptoms may become of serious significance and occasionally the condition is fatal.

3. The clinical picture of paralytic ileus simulates that of any obstructing lesion of the small bowel, but its differentiation from intestinal obstruction of mechanical or vascular origin is of the greatest importance. The differential diagnosis is best made by the use of the stethoscope. In all cases of paralytic ileus no sounds such as metallic tinkles, borborygmi or explosive noises are audible, while in the other types of obstructions these are plainly heard especially at the height of the pains.

4. The treatment of ileus of reflex origin depends upon the degrees of dehydration, demineralization, alkalosis and abdominal distention which are present. This is accomplished by restoration of fluids either by vein or under the skin, administration of chlorides by the same routes and decompression of the bowel by the continuous intra-enteric suction with the Levin catheter

tipped nasal tube introduced into the stomach and proximal duodenum.

5. When the ileus is purely reflex in origin, such as was the case herein reported, results of treatment may be expected to be good.

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A Country Doctor's First Experience in Obstetrics*

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A YEAR ago I thought of addressing this society on the subject of home versus hospital delivery and thought I might have the audacity to suggest that it appeared to me that possibly the parturient woman and her baby were just as well off in her home as in a hospital.

I had seen some of the more prosperous members of the community go away to hospitals for their confinements, most of them to a nearby institution of high repute. A surprising number of them developed breast abscesses before or after they came home. Some of the new babies had furuncles and acne. A much wanted and long awaited first baby died of abscesses of the liver three weeks following normal full term delivery in the hospital. The results in my own country practice seemed fairly good and I no-

ticed a surprising scarcity of infections of any kind.

However, I knew that leading obstetricians and most of the other physicians in practically all cities were insisting that their patients be confined in hospitals; that U. S. government bulletins were recommending hospital delivery; that mothers were being told in every possible way that they and their babies were safer in a hospital. The rapidly increasing use of the hospital for obstetrics is occurring in Europe as well as throughout this country.

In the face of this worldwide movement it seemed absurd that I, with my insignificant experience and my unscientific observations, should raise my feeble voice in protest.

Now, however, that the great De Lee has recently impressed upon the profession generally, certain imperfections of our hospital system for obstetrics, and has said that "numerous au-

*President's address, read at the Sixty-fifth Annual Meeting of the Wabasha County Medical Society, Wabasha, Minnesota, July 6, 1933.

thors call attention to the high institutional mortality compared with that of deliveries in the home," I feel that it is not unseemly that I join in the chorus.

With your kind indulgence, then, I shall take the liberty of reporting in some detail the results in a small and unimpressive number of obstetric patients who were attended in country homes by an ordinary general practitioner. My object is not to prove anything in particular, but merely to present the figures that they may be added to others and used in comparison with hospital results.

No attempt is made here to review the literature on the subject because that was comprehensively done in the article of Dr. De Lee's referred to above.

Two hundred and sixty obstetrical cases are here reviewed. The patients were largely wives of farmers and were all delivered in their own homes either on farms or in villages, during the last four and a half years. Economic conditions forced most of the patients to use the services of friends or relatives for nursing care. Only about ten per cent engaged trained nurses; another ten per cent, practical nurses.

AGE DISTRIBUTION

The age distribution of the sixty-six primiparæ (average age 22.9 years) was as follows:

Age in Years, Inclusive	Number of Cases
15-19	21
20-24	27
25-29	14
30-33	4

The age of multiparæ ranged from eighteen to forty-five years and their average number of previous pregnancies was 3.03.

ANTEPARTUM CARE

Antepartum care in the office was given to 185, or 71 per cent, of these women. Seventy-five, or 29 per cent, of them were seen for the first time when in labor. Those women who presented themselves for antepartum care made an average of four such visits to the office.

COMPLICATIONS OF PREGNANCY

Pregnancy was complicated by pernicious vomiting in one case; in only three other cases did the nausea and vomiting cause the patients great annoyance and it did not attain serious proportions in these. Signs of toxemia of pregnancy were discovered in only two cases and these, treated with rest and diet, improved and

were delivered uneventfully. Anemia of serious degree complicated the pregnancies of two patients; both delivered prematurely and their babies did not live. Hemorrhage and threatened premature labor occurred in five patients who carried their babies to full term. Varices of the lower extremities and vulva caused serious inconvenience in four cases; hemorrhoids in three. A severe unretractable and unexplained pruritus of the entire skin occurred in one patient during all of her pregnancies. Sacroiliac pain required strapping in three cases. Nine other patients complained persistently of pain in the back and abdomen during the third trimester.

DURATION OF LABOR

The duration of labor in primiparæ ranged from four to fifty-five hours; average fifteen hours. The duration of labor in multiparæ ranged from one to twenty-eight hours; average 9.4 hours.

PRESENTATION AND POSITION

Twenty cases (7.5 per cent) had a precipitate delivery before the arrival of the physician. In cases where the presentation and position were noted, 70 per cent were occiput left anterior, 15 per cent occiput right posterior, 10 per cent occiput right anterior, 4 per cent breech, 0.5 per cent occiput left posterior, 0.5 per cent face.

OPERATIVE PROCEDURES

Low forceps were applied thirteen times. Mid-forceps operation was performed five times. Forceps (low and mid) were used in 6.9 per cent of all cases. Episiotomy was done five times. Breech extraction was performed in seven cases; manual dilatation of the cervix in two cases; manual removal of the placenta in one case; internal podalic version and breech extraction combined with craniotomy in one case.

COMPLICATIONS OF LABOR

Abnormalities noted at the time of labor included polyhydramnios in four cases, oligohydramnios in one, all associated with monsters. Loss of blood was remarkably small in most cases, attaining the amount of 500 c.c. in only eight cases, 1,000 c.c. in two cases. Primary inertia of labor was noted three times. Prolapse of the cord occurred once, in the case of an hydrocephalic fetus. One patient, after retaining the placenta for 7.5 hours, was in such serious condition from loss of blood, having flowed in-

termittently throughout her pregnancy, that consultation was called and the placenta removed manually. This was followed by good recovery.

LACERATIONS

Lacerations occurred in sixty-six patients or about 25 per cent of the total number. Of these, forty-nine (19 per cent of all patients) involved only the skin or mucosa. In addition to the five times episiotomy was done, second degree lacerations were noted ten times; third degree lacerations, twice.

POSTPARTUM COMPLICATIONS

There was no mortality among the mothers. There was no case of puerperal sepsis. In a few cases retained lochia caused temperature elevations of 100 to 101 degrees F., but in all cases this returned to normal within twenty-four hours, with the exception of that of a dwarf woman who, after a difficult labor, was unable to void her urine for ten days, was catheterized by a slovenly practical nurse, developed a severe cystitis, and had a fever for two weeks.

Postpartum eclampsia occurred once, in the case of an unmarried primipara who received no antepartum care. The patient recovered after several hours of convulsions.

Slight postpartum bleeding continued for six weeks in three patients; no serious postpartum hemorrhage occurred. One young woman presented a cystocele and partial prolapse of the uterus following the second of two mid-forceps deliveries (the first one performed in a hospital elsewhere). One breast abscess occurred (five months postpartum). One low grade breast infection lasted six weeks but did not progress to abscess formation.

DRUGS USED

Obstetrical pituitrin was used, usually in 0.5 c.c. doses, during the second stage of labor in 91 cases (about 35 per cent). Morphine was used during the conduct of labor in ten cases; sodium amytal (orally) in six; the synergistic analgesia of Guathney in four cases. Chloroform anesthesia was used in most cases; ether in operative cases. Ergot was given routinely after the third stage.

WEIGHT OF BABIES

The full term babies ranged in weight from 5.75 to 10.25 pounds, averaged 7.75 pounds; the

prematures ranged from 1.5 to 5.75 pounds, averaged 4.2 pounds.

STILLBIRTHS

From these 260 parturitions, 264 babies were born; 143 male, 121 female. Nine babies were born dead. The stillbirth was attributed to developmental anomalies incompatible with life in six of these nine cases; premature delivery of twins from a mother with a severe anemia of undetermined origin accounted for two others; distocia in the case of a dwarf woman with generally contracted pelvis was the cause of one.

INFANT MORTALITY

Of the 255 babies born alive, twelve died during the neonatal period. Of these eight were definitely premature. Two were neglected illegitimate babies. One was luetic. One full term infant died suddenly forty-eight hours following low forceps delivery of a primipara and the death was attributed to cerebral injury. In addition to these twelve neonatal deaths, three babies died later in the first year, all three deaths being due to spina bifida with meningocele and cord involvement.

INFANT MORBIDITY

Of the babies, one developed melena neonatorum (recovered following subcutaneous whole blood injections); two developed pylorospasm. No cord infections were discovered except possibly in one baby, a premature, jaundiced, who died in three weeks and in whom a slight redness about the navel suggested the possibility of cord infection.

SUMMARY

Two hundred and sixty home deliveries are reported, with no maternal mortality, no incidence of puerperal sepsis, and the loss of only two babies (one stillbirth and one neonatal death) attributable to labor.

CONCLUSIONS

Although this series of cases is much too small to be significant for use in comparing with maternal and infant mortality rates, the results of obstetrics as practiced in country homes seem to compare favorably with hospital results.

This has been explained as being due to the fact that the danger of working in a place where germ laden people are crowded together under

one roof more than offsets the advantages obtained from better equipment and better facilities for aseptic technic, plus the fact that "meddlesome midwifery" is more apt to occur in a hospital due to the false sense of security which obtains there.

Until such time as radical improvements are made in our hospital system for obstetrics, it would appear that the average rural woman and

her baby are quite as safe when confinement occurs in her own home.

If this be true, isn't it time for doctors and public health agencies to stop issuing propaganda for hospitalization of all maternity cases?

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Traditions of the Medical Profession*

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THE cult of medicine is as old as birth, illness, and death, and its origins are intimately connected with the beginning of religious ideas and taboos. The supernatural played a dominant part in the art of medicine in the early days of man. But as education and enlightenment progressed, the rôle of the supernatural assumed a decreasing importance. It is a far cry from the Voodoo priests of Africa or from the American medicine man, to the practice of modern medicine. No pages in the history of our civilization are more interesting, fascinating, and romantic than those that record the discoveries in biology and modern medicine. No profession has done more to advance our civilization than has the medical profession. By discovering the cause of many diseases, ways of transmission, methods of prevention and cure; and by the application of this knowledge to our everyday life we have been able to lessen the incidence of disease, relieve pain, prolong life, and greatly add to the sum of human happiness. I am not attempting at this time to utter an apostrophe to the physician but to picture as well as I can the traditions of the medical profession as they have arisen through the ages and developed through struggles against the forces of darkness, ignorance, and superstition, through crucifying trials greater than those of any other profession in the history of man.

One day in the middle of the last century a sensitive young Englishman, a recent graduate from a mercantile school, after a few months in business life became depressed by its narrowness

and its lack of vision, and suddenly determined to visit America. Landing in New York on a beautiful Sunday morning he leisurely walked up Broadway, observing the marvelous scenes which unfolded themselves before his observing eye. Suddenly he stopped and in his enthusiasm exclaimed: "This is the country for me; here are no poor." Later, to his only child he often said, "Don't make the mistake I did; don't enter business; don't be a white collar drudge. Have your craft in your hand or your profession in your head. Be a painter, be a lawyer; best of all, be a doctor. Then you will acquire medical traditions; and if you are true to them, its practice will satisfy the cravings of your soul. For the predominant thought in all business occupations, be it that of clerk or financier or whatnot, is profit for self; while the ethics of the true physician is the sacrifice of self for the betterment of others, even all humanity." "The merchant at most can make a fortune, which vanishes, but the physician can make a name for himself which will endure."

Most of us, I am sure, did not have such a vivid picture of the profession brought before our minds when we decided to take up medicine as a life work. Perhaps during our early years we fell under the influence of the old family physician. He was our pattern, our ideal, and through his influence we decided to study medicine. This family doctor himself undoubtedly chose the medical profession for the same reason and so on through the past, each of them in turn a follower of Hippocrates, practicing the art of healing.

*Presidential Address before the annual meeting of the Southern Minnesota Medical Association, New Ulm, September 25, 1933.

Notwithstanding all that the medical profession has done and is doing to prevent and alleviate suffering, recently a number of perhaps well meaning laymen and a few physicians with an abundance of theories and an emaciation of practical experience as physicians, have reached the conclusion that there is something radically wrong with the administration of sick relief and its cost. Most of the personnel of this commission who signed the majority report concerning the cost of medical care were not men engaged in the active practice of medicine, hence they were out of touch with the medical mind, the traditions, ethics, experience, and ideals of the profession. Their theories as to the socialization of medicine have been so adequately dealt with in other places that I need only to mention them in passing. From the point of view of the State, socialization would involve the difficulties of an added tax burden, sufficiently staggering at present, in addition to complicated administrative problems. On the other hand the medical profession would be reluctant to be demoted to just an ordinary cog in any social business scheme. I refer to our professional tradition with a history of more than 2,000 years, a history of men and their achievements to which we can turn and look back with pride. It is this tradition that I am going to discuss with you for a brief time.

Whether or not there ever was such a person as Æsculapius is uncertain. He was reputed to be the son of Apollo, the God of youth, who looked after the comeliness and strength of his people. Æsculapius' grandsire was Zeus, who cared for their intelligence, so Æsculapius decided to look after the ills of his people. The legend relates that he had two daughters, Hygeia and Panacea, with whose help he became so proficient in the healing art that he incurred the wrath of Pluto, God of the nether world, who complained to his brother Jove, "My business is going to hell. This Æsculpius is healing so many people that I find a decided falling off in the number of shades that should be coming to me. Something must be done." Thereupon his obliging brother Jove nicked Æsculapius to the Shades with a thunderbolt.

To what extent Æsculapius was a real person and to what extent he was a myth matters little. We know that by the end of the fifth century B. C. the cult of Æsculapius was firmly established in Greece, and had reached a high degree

of development. There was a sound and reliable art of medicine taught in the schools which had been established in the older temples dedicated to Æsculapius and dominated by masters of established reputation and authority. The cult founded by the Æsculapian school of medicine and the ideals developed therein were destined to live and to prosper through the activities of Hippocrates, the greatest medical apostle of ancient times.

The best traditions of the medical profession are symbolized in the name of Hippocrates, the Father of Medicine, the Great Physician as he was called by Aristotle. The ideals of Hippocrates, which have been adopted as the ideals of all physicians, are recorded in the Hippocratic Oath. The Hippocratic Oath represents the charter of the ethical faith of the profession of medicine. It is as essential that the 20th century physician should observe its tenets as it was for the contemporaries and immediate followers of Hippocrates. It has not grown old, and it is applicable to modern medicine. Let us therefore examine in its important details this Oath and renew our knowledge of what its lessons are. It begins solemnly and religiously.

The Invocation.—"I swear by Apollo, the physician, Æsculapius, Hygeia and Panacea, and by all the gods and goddesses that according to my ability I will keep this Oath and stipulation."

Gratitude.—"To reckon him who taught me this art equally dear to me as my parents, to share with him my substance and relieve his necessities if required, to regard his offspring as on the same footing as my own brothers, and to teach this art should they wish to learn it, without fee or stipulation." In this paragraph at the outset he sets forth the desire to exhibit gratitude. From his teacher he has received intimate knowledge concerning the human body, its ills, their causes and cure. It is said that ingratitude is the basest, as it is the most common, of human traits. It should not be necessary to dwell on the peculiar virtue of the opposite characteristic—gratitude. Doctors are perhaps in a better position than any other group of men to fully appreciate it. Neglecting to remunerate the doctor when the emergency demanding his presence is past is so frequent that it has become proverbial.

Ideal.—"I will follow that method of treatment which according to my ability and judgment I consider for the benefit of my patients, and abstain from whatever is deleterious and mischievous."

In the following sentences, however, he passes beyond the ethics of the physician in relation to his patient, and emphasizes the attitude the true physician should assume towards the public.

"Into whatever homes I enter I will go into them for the benefit of the sick, and I will abstain from every voluntary act of mischief and corruption and further, from seduction of males or females, of free-man or slaves. Whatever in connection with my professional practice or not in connection with it, I see in the lives of men that should not be spoken abroad, I will not divulge it, reckoning that all such should be kept secret."

In the minds of high minded medical men this paragraph looms large, as well it may. The obligation thus enjoined, you will note, is not confined alone to medical practice but is a rule of action which should govern the physician in his conduct under all circumstances. The doctor is not to gossip about his patients, of course; but neither is he to gossip about anyone else.

The Goal.—"While I keep this Oath inviolate may it be granted to me to enjoy life and the practice of the art respected by all men in all times, but should I trespass and violate this Oath may the reverse be my lot."

By virtue of this Oath medical education is the peculiar responsibility of physicians. Hippocrates perceived that medicine must not be made a common thing, that in its very nature only true gentlemen could be safely entrusted to practice it. The neglect of this fundamental condition with respect to initiates has been the cause of all the serious troubles which have beset the medical brotherhood. The status of intimate friend and comforter in the homes of the afflicted, where pain and distress have stripped soul and body bare of every veneer that civilization has provided to keep self respect alive, can be satisfactorily achieved only by one who is wise in his heart, humble in spirit, and true and clean in heart and life.

The respect of all men has been in a peculiar degree the possession of the true doctor through the ages, and that respect and veneration have not been simply because of his services but more definitely because of himself, his principles, his character, his attitude in the stresses that befall his clientele; indeed, it is these traits of character and his faith, rather than his works, which stamp him as one that can be relied upon in every emergency. From the time this Oath was written, some twenty-five centuries ago, until the present time, it has been handed down from year to year, and from generation to generation. During these passing centuries medical history brings to us tales of heroism and martyrdom in

the cause of human suffering, names and deeds which brighten history's pages and which are destined to live as long as love for humanity burns in the human heart.

All countries have made contributions to medicine, but only at such times as man's thought was free; for all oppression stops thought; and whenever a restraining hand is placed on the mind of man, the understanding of life sickens and fades.

Of the great number who have given so much to medicine and to whom it is fitting that we pay tribute, at this time, I can name only a few: Celsus, who early in the first century defined the medical terms as they were then understood and wrote them up in an encyclopedia; Galen, who in the second century founded experimental medicine, and established his name as the greatest Greek physician after Hippocrates; Vesalius, the anatomist; Paracelsus, the founder of chemical pharmacology; Ambroise Paré, the greatest army surgeon of his time; Harvey, discoverer of the blood circulation; Oliver Wendell Holmes and Ignaz Semmelweis, who discovered the cause and prophylaxis of puerperal fever; Thomas Sydenham, who in the sixteenth century was known as the Hippocrates of England and the greatest bedside observer of his time. Louis Pasteur and Robert Koch, founders of bacteriology and sanitation; Lister, who gave us asepsis and antiseptics; Walter Reed, who discovered the cause of yellow fever; Ross, who led the way toward wiping out malaria; Edward Jenner, who was responsible for ridding the world of the scourge of smallpox; Long, Wells, and Morton, who gave us anesthesia. Added to these there have been prominent American physicians and surgeons who have contributed their share; McDowell, Sims, Halsted, Fenger, Senn, Billings, Murphy, and Deaver.

America, the mother of technical efficiency, is at present adding names that will be written high in the galaxy of eminent physicians and surgeons; such as Banting, Cushing, and Crile, and it is unnecessary for me to mention to this body the names of our honored fellow members to whose institution we are indebted for so much of the success of these meetings, and whose names are known the world over for their contributions to medicine and surgery.

Today we have the healthiest condition the world has ever known. This is due in great part

to the extra-professional services of physicians to their communities in promoting sanitation, securing legislation for health projects, and doing missionary work for disease prevention. The last fifty years have seen spectacular developments in public health work with more to come. At the present time we have health agencies in every city and hamlet doing valiant service. The majority of the health officers receive the liberal salary of \$1.00 per year, and for this munificent sum they must direct the health of all the people, even to the extent of endorsing certain makes of rat traps. If the art, science, and practice of medicine are to continue to be of their full benefit, then the public must come to a realization of their responsibility for the continuance of medicine as it is today, must acknowledge its prestige and give full coöperation.

After a year as president of this association I have one thought I should like to leave with you. I should like to insist that medicine must be progressively conscious—if necessary, emphatically conscious—of its own intrinsic dignity, even in the face of popular clamor. It has a character

to maintain. If "Noblesse Oblige" is still to be the watchword, then the medical man should not permit himself to become the tool of an insurance company, the underpaid servant of some policy holder. Not in that direction lies continued success. The real progressive evolution of medicine demands that medicine be allowed to develop in complete independence and not merely as an adjunct to social science. For the welfare of the public let not the idealism, the self respect of the medical profession, its quasi-sacred character, be traitorously sold for a pot of silver. Let the medical profession be in charge of its own house.

We as physicians are heirs to a great tradition. By the greater insight into life which our learning should give, by the spirit that its tradition should develop and has developed during these hundreds of years, we should keep that inheritance sacred and inviolate. With Dr. McCrae who died in the line of duty in Flanders, let us say as he said to the class he taught:

*What I spent I had—
What I saved I lost—
What I gave I have.*

Chronic Intussusception in the Gastro-Intestinal Tract

A Report of Thirty-Nine Cases

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WE HAVE reviewed, recently, a series of thirty-one cases of acute intussusception at The Mayo Clinic. In general, the review corroborated facts that had been gleaned in previous studies of the subject. Our primary object in making these studies is to find some means of improving methods of caring for patients suffering from intussusception, either acute or chronic.

In distinguishing between the acute and chronic forms of intussusception certain facts are outstanding. Approximately 80 per cent of the acute intussusceptions occur among children aged less than two years, whereas the youngest patient in our series with chronic intussusception was aged ten years, and most of them were in

the fourth and fifth decades. Moreover, a pathologic cause is rarely found for acute intussusception of childhood, while the opposite is true of the chronic types. Naturally, too, there is a marked difference in severity of symptoms.

We shall not consider here a subacute form of intussusception. It is obvious that if the subdivisions of the acute and chronic forms are recognized a subacute condition may also exist, but for the purpose of our study it is not significant, since, so far as the patient is concerned, intussusception is with rare exceptions a surgical condition and the choice of surgical procedure needs no finer distinction than the divisions of acute and chronic intussusception.

Chronic intussusception, like acute intussusception, may occur in any part of the gastrointestinal tract, although the most likely points

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are in the more mobile portions of the bowel, namely, the small bowel, cecum, transverse colon and sigmoid colon.

In our study of these thirty-nine cases of chronic intussusception, the term chronic is applied to cases in which symptoms of intussusception had existed for several days to as long as two or three years. In the cases in which tumors are presented as the exciting cause, it is frequently difficult to interpret the exact duration of the intussusception.

There was a wide variation in the age of the patients; the youngest was aged ten years and the oldest sixty-nine. As stated, the largest number were in the fourth and fifth decades of life. Thirty of the patients were males and nine were females; a ratio of three to one, as compared to two to one in the acute form.

Symptoms depend on the degree of obstruction, the site of the intussusception, the pathologic cause, and the duration of the pathologic cause per se. Usually low grade or partial obstruction is present but obviously this may progress to the point of acute obstruction, manifesting an acute exacerbation of a chronic condition. Patients often exhibit amazing tolerance to extensive intestinal lesions of long duration. It may be said also that the intestinal tract exhibits amazing ability to restrain symptoms in the presence of marked obstruction.

In our consideration of these cases we have divided them into groups, depending on the situation of the intussusception, as follows: stomach, small bowel, ileocecal coil, appendix, transverse colon, and sigmoid colon.

STOMACH

Several cases have been reported in the literature in which chronic intussusception followed gastro-enterostomy. We have not observed such a condition. The proximal loop of bowel in these cases has intussuscepted or prolapsed through the artificial stoma into the stomach proper. Operation has been necessary in order to accomplish reduction and fixation, or section, depending on the individual case. Shearer and Pickford, in 1928, noted reports of twenty-four such cases in the literature.

SMALL BOWEL

There were eleven cases of chronic intussusception in the small bowel. The cause in one case was indefinite, and in one it was the result of

Meckel's diverticulum. In nine cases it was the result of tumors of the small bowel; three of these nine tumors were sarcomas, two were carcinomas, two were nonmalignant polyps, one was a fibromyxoma, and one a lipoma.

Intussusception is a possible complication in the presence of any tumor of the small bowel. The two chief factors in the syndrome of carcinoma in this organ are intermittent obstruction

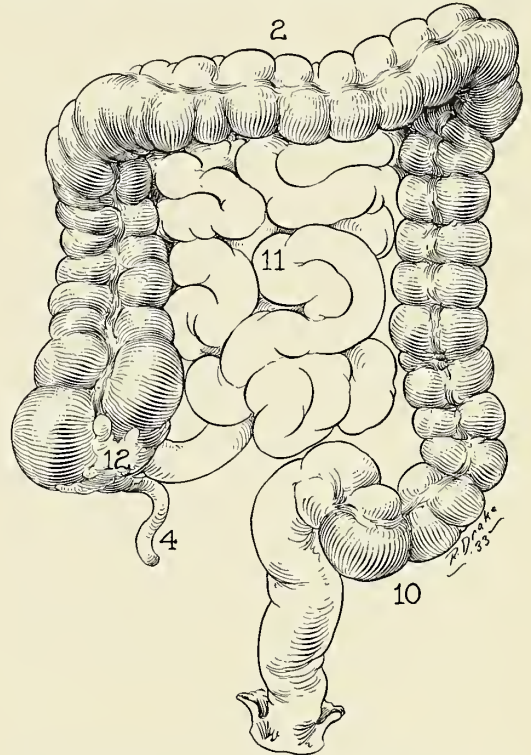


Fig. 1. Distribution of thirty-nine cases of chronic intussusception in the intestinal tract; the figures represent the number of cases occurring at the various points.

with shorter intervals of relief, and the presence of secondary anemia which not infrequently may be wrongly diagnosed pernicious anemia.² A movable tumor may be felt, depending on the size of the mass and the obesity of the abdominal wall. The pain is usually on the left side, but variable as to exact situation.

An attempt to reach a too exact diagnosis by the use of the stasis ray may complicate partial obstruction by creating an acute condition for which enterostomy alone must precede further operative procedures; at least, there is the possibility of unwarranted surgical delay while the bowel is being cleaned out medically.

Surgical resection was done in eight of the eleven cases and reduction of the intussusception in three. In one of these, following reduction,

the bowel was opened and a lipoma removed, the incision was closed in the opposite direction. Four of the patients died, a mortality rate of 36 per cent.

Resection is preferred in most cases of this nature because the underlying pathologic condition is so often malignant. The type of reanastomosis, whether end-to-end, side-to-side, or end-to-side, is a matter of choice on the part of the surgeon. The mortality rate is high but, on the other hand, the condition usually is serious.

ILEOCECAL COIL

There were twelve cases of chronic intussusception of the ileocecal coil. In seven cases the condition was caused by carcinoma, and in five the causative agent was questionable. Of the seven cases of carcinoma, resection was done in six and ileocolostomy in one, with no surgical deaths. However, the patient who underwent ileocolostomy died at his home three months after the operation, so that the planned resection could not be carried out. Resection in this area was accompanied by a side-to-side or end-to-side ileocolostomy. In four cases the intussusception had progressed to or into the transverse colon. Of the five cases, resection was done in four, and reduction of the intussusception in one case. Two of the patients who had resections died. The surgical mortality rate in this group was 16.6 per cent.

APPENDIX

Intussusception of the vermiform appendix is a relatively rare condition. Four of our cases were sufficiently marked to be included in this series. In one case the intussusception was complete, so the tip of the appendix was felt within the cecum. In one case, three-fourths of the appendix, and in one case three-fifths of the appendix had regressed into the cecum. In the fourth case, the condition was discovered accidentally during operation for disease of the gall-bladder, and was evidently secondary to tuberculosis of the cecum and ascending colon, for which resection of 7.5 cm. of ileum, cecum and ascending colon, was done with end-to-end anastomosis.

When intussusception of the appendix occurs it may act as a polyp, and although this is open

to argument, we believe that it may be the primary cause in at least some of the unexplained cases of ileocecal intussusception. There were no deaths in this group of cases.

TRANSVERSE COLON

Two cases were included in this group; both were due to carcinoma. One patient died following operation. The other was operated on early in 1919 and was well in 1926; this operation consisted of resection with end-to-end anastomosis, and appendicostomy for a safety valve.

SIGMOID COLON

There were ten cases of chronic intussusception of the sigmoid, eight of which were due to carcinoma, one to lymphosarcoma, and one to lipoma. Such intussusception may be extensive enough to be palpated by a finger in the rectum. A high growth may descend to a point at which it can be reached by the proctoscope and a specimen removed for diagnosis. It is possible, too, for the growth to protrude from the rectum. The case of lymphosarcoma had been reported recently by Dixon.

Resection invariably was the operative procedure. Preliminary colostomy was done in several cases, and primary resection with end-to-end anastomosis in others. The method of dealing with each case varied, depending on the case and the judgment of the surgeon. Three of the patients died, giving a surgical mortality rate of 30 per cent.

SUMMARY

The treatment for chronic intussusception is surgical, and the aim of treatment should be the primary or eventual removal of the causative agent. This is important since the agent is of a malignant nature in a large percentage of cases (56.5).

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The Heart in Hyperthyroidism*

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THE repeated emphasis upon disturbances of the heart in hyperthyroidism is justified because of the frequency with which hyperfunctioning goiter is still unrecognized as a contributing cause of cardiac arrhythmia and failure. No originality can be claimed by writers in the last decade for this emphasis. Years previously Kocher recognized the thyroid heart. Romberg⁹ assigns an important place to the thyrogenous factor in the etiology of arrhythmia. In his treatise he states that atypical forms of Basedow's disease are characterized most frequently by cardiac manifestations. Undoubtedly in centers where large numbers of patients with thyroid disease were treated the condition has been emphasized. However, the advent into clinical medicine of the determination of the basal metabolism has added distinctly to our knowledge of the course of thyroid disease and, by its aid, cycles of hyperfunction and sometimes continued hyperfunction have been shown to exist which before were not demonstrable with certainty. Levine⁶ in 1924 described hyperthyroidism masked as heart disease. In 1927 the writer⁷ described under the title "Atypical Hyperthyroidism" a group of cases whose underlying hyperthyroidism was obscured or masked but definitely demonstrable on careful study. The individuals described had goiter, often adenomatous, sometimes insignificant in size, with such minimal tachycardia, nervous and metabolic changes that the underlying hyperthyroidism, particularly in periods of remission, could be established only by careful examination and reexamination with several determinations of the basal metabolism. It was stressed that from this group of patients with long continued hyperthyroidism auricular fibrillation and sometimes, ultimately, heart failure might be expected to develop; and that in the fifth, sixth, or seventh decades the heart phase would predominate and mask entirely the provocative hyperthyroidism.

In the recent symposium of the American Heart Association upon the thyroid heart, there was a tendency to emphasize the fact that when cardiac failure in hyperthyroidism supervened it was usually in those individuals whose cardiac reserve had been encroached upon by degenerative cardiovascular disease. Andrus,² for instance, recounts that the work of the heart is increased by the increased circulatory demands created by the augmented metabolism including that of the heart muscle, that the glycogen content of the heart in experimental hyperthyroidism is reduced, that sometimes the lactic acid content is increased, and suggests that myocardial insufficiency may supervene in hyperthyroidism when the load approaches or exceeds the limit set by its own metabolism. Lerman and Means⁴ stated that the hyperthyroidism *per se* does not produce so-called thyroid heart disease but causes functional derangement in a cardiovascular system already damaged by other pathological conditions. Rake and McEachern⁸ found no specific lesion in the myocardium. The only morphological changes Weller¹⁰ and others found consisted of a higher incidence of myocardial fibrosis and cellular infiltration in exophthalmic goiter. Lev and Hamburger⁵ noted association of angina pectoris and hyperthyroidism. Anderson¹ noted that auricular fibrillation depends upon the duration and severity of the process. Kepler and Barnes³ noted that in a series of 178 fatal cases of hyperthyroidism, severe congestive failure occurred in 27, and in one-third of which (9) no cause other than hyperthyroidism occurred.

Three illustrative case records are presented. The first shows the development of a minimal and often unrecognized type of hyperthyroidism in the fourth decade in an individual first observed ten years previously.

Case 1.—Miss A. C., aged thirty-eight, by occupation a bookkeeper. The past history revealed scarlet fever at the age of seven and occasional sore throats. Physical examination seven years previously had revealed slight inanition and small multiple ade-

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noma of the thyroid without hyperfunction. The systolic blood pressure was 126, diastolic 86. Yearly rechecks showed no essential physical change. In the sixth yearly recheck, increasing frequency of sore throats was noted, and tonsillectomy was advised and later performed because of chronic tonsillitis. A slight afternoon elevation of temperature otherwise unaccounted for occurred for a few weeks. In the seventh year the patient noted moderate increase in the size of the thyroid and again consulted the writer. At this time no systemic complaints were noted. The pulse rate, which was recorded at yearly intervals as 104, 84, 88, and 78, had increased to 110. There was moderate tremor. The eyes were normal. The thyroid was increased in size and contained multiple adenomata. While unstable vasomotor reaction had been noted previously there was at this time increased flushing of the skin with increased sensation of body warmth. Increased appetite without weight gain was noted. The blood pressure varied within normal limits. The basal metabolism which nine months previously was minus 3 per cent was elevated to plus 16 per cent, and in one later test, to plus 12 per cent. The basal metabolism slightly but consistently above the limits of normal was emphasized because a previous record of minus three per cent indicated the level before hyperfunction occurred.

A special opportunity existed here because the patient was an institutional assistant of whom annual physical examinations were required. It is seen by study of this record that the change in function as measured by the basal rate from a low normal function to above normal limits is definitely significant when interpreted in terms of the clinical picture which developed coincidentally. This consisted of vasomotor changes with flushing of the skin, increased sense of warmth, increased heart rate, and slight nervousness. The nutritional change was insignificant. Study of the basal metabolism series showed beautifully the gradual increase, and while the highest metabolism obtained was only slightly increased at plus sixteen per cent, the total increase from minus three per cent, representing a nineteen per cent increase, was definite, and interpreted with the clinical findings, definitely established the diagnosis of hyperthyroidism although of a degree probably inadequate in most patients to lead them to seek medical advice. The patient was referred to surgical service for thyroidectomy. After the operation there was alleviation of symptoms and within seven weeks the basal metabolism was plus 9 per cent and within seven months minus 2 per cent.

That hyperfunction in adenomatous goiter may be delayed until the later decades when there is an increase in the prevalence of cardio-vascular degenerative diseases is shown in the following case.

Case 2.—Mr. F. H. M., aged sixty-three, married, a banker by occupation. Good health had existed pre-

viously with the exception of obesity—250 pounds. The patient was first seen briefly six months previously with the complaint of pain in the left groin incidental to a small inguinal hernia. His appearance at the time strongly suggested hyperfunctioning goiter, but complete examination was not possible. The history of the first phase of the present illness dated back to 1928, when, following an acute respiratory infection and also financial reverses, break in health had occurred. This consisted of weakness with disturbed heart action, nervousness, emotional change, and weight loss. His physician, Dr. H. M. Juergens of Belle Plaine, had reported after careful observation that total cardiac arrhythmia existed. After a few months, there had been marked improvement of symptoms. Within the past few months he had noted a recurrence of symptoms consisting of restlessness, flushing and warmth of the skin, without, however, dyspnea. The weight had gradually fallen to 172 pounds. This exacerbation of symptoms was not so great as the previous increase in 1928.

Examination revealed evidence of weight loss, moist oily skin with slight increased pigmentation, a slight tremor, negative eye signs, adenomatous goiter without appreciable changes in the cardiac outline by six foot film, or tones of rhythm as shown by electrocardiogram. The rate was slightly accelerated (90). There was moderate thickening of the peripheral blood vessels. The blood pressure varied between 144/68 and 116/58. The basal metabolic rate was plus 33 per cent and after four weeks plus 12 per cent. Subtotal thyroidectomy was performed by his surgeon with rapid and uneventful recovery, and thirty-five days later the basal metabolism had fallen to minus 12 per cent, and the pulse to 74.

In view of the mild hyperthyroidism and a previous auricular fibrillation, thyroidectomy was considered to be the procedure of choice in order that the heart be spared an avoidable burden during old age.

That the hyperthyroidism may be quite effectively masked after cardiac decompensation supervenes is illustrated by the following case.

Case 3.—Mrs. J. A. S., aged fifty-one, a housewife. Patient was admitted to Asbury Hospital with complaints of shortness of breath and precordial pain. The past history revealed diphtheria at five years, scarlet fever at eight years but no rheumatic fever or chorea. The patient had "chronic bronchitis" for about thirty years. The family history was unimportant.

Precordial pain (description not obtained) was said to have been present for over ten years. Fifteen months prior to admission, dyspnea began and became much more marked three months ago. It is interesting to note that four months after the onset of the present illness the patient consulted physicians at the Mayo Clinic where a diagnosis of exophthalmic goiter (substernal) was made. The basal metabolism at that time was plus 43 per cent. The pa-

tient refused thyroidectomy. Her local physician stated that on various observations the blood pressure varied from 160 to 198 mm. systolic to 78 to 98 mm. diastolic and that there was evidence of weight loss and moderate exophthalmos. Physical examination revealed orthopnea without appreciable cyanosis. The dyspnea was not high grade. There was slight exophthalmos without lid lag. The thyroid was scarcely palpable. The heart showed marked enlargement of all chambers; on the six foot film the transverse thoracic diameter was 27.1 cm. and the total transverse cardiac diameter was 21.4. The rhythm was regular, the rate varied from 76 to 112, often recorded 84 to 94. There was a diffuse precordial wave without thrill. A circumscribed systolic murmur was present along the left sternal border in the second to the third interspaces. The blood pressure was systolic 112, diastolic, 80. There were a few moist râles at the lung bases; the liver edge was barely palpable. There was no ascites, and the extremities were free from edema.

The electrocardiogram showed evidence of myocardial damage with wide QRS wave and right ventricular preponderance. The basal metabolism was plus 45 per cent. After Lugol's solution, in thirteen days it receded to plus 36 per cent and two weeks later to plus 26 per cent.

In the hospital under treatment including bed rest and the use of Lugol's solution there was some alleviation of dyspnea and headache although the precordial pain was present at intervals; the condition on discharge was essentially the same.

The impression of the sequence of events was: (1) hypertension; (2) cardiac hypertrophy and coronary disease; (3) superimposed exophthalmic goiter, and (4) cardiac decompensation. It is believed that the patient denied herself partial relief in refusing thyroidectomy, by which the added circulatory demands of exophthalmic goiter could have been removed from the heart already overburdened by hypertension and by coronary disease.

Masking of the hyperthyroidism is well illustrated in the above case. A very competent surgeon denied that exophthalmic goiter existed because of absence of palpable thyroid enlargement (see x-ray description of substernal goiter). However, the exophthalmos, and nervous symptoms of tremor and excitability pointed to hyperthyroidism in view of persistent increase in metabolism. In this individual case, while it is impossible to reconstruct the picture of the total duration of the disease, certainly the therapeutic problem of management of the impending cardiac decompensation would have been simplified had thyroidectomy been performed.

SUMMARY

A clinical study is made of three selected cases of hyperthyroidism which illustrate stages in the life cycle of hyperthyroidism. An appreciation of these stages clarifies the provocation of the heart disturbances.

In the first instance, simple adenomatous goiter was observed in an individual for ten years, from age twenty-eight to age thirty-eight, at which time a periodic recheck revealed hyperthyroidism inadequate in itself, however, to disturb the patient. Thyroidectomy was advised and performed to eliminate in the future increased cardiovascular load of hyperfunctioning adenomatous goiter.

In the second instance the patient, aged sixty-three, when seen for a minor complaint, presented likewise hyperthyroidism that was inadequate to cause complaints. Later checkup substantiated the diagnosis of mild hyperfunctioning adenomatous goiter with a probable exacerbation and auricular fibrillation five years previously. Essentially the same process is present as in Case 1 except in an advanced decade and in an individual in whom previous auricular fibrillation forewarned of cardiac disturbance.

Case 3 represents that stage of exophthalmic goiter in which cardiac decompensation overshadowed and masked the hyperthyroidism. Its existence was revealed by complete examination, and its significance lay in provocation of the cardiac decompensation and possibly of the coronary disease.

Clinical study, particularly since the advent of clinical calorimetry, has established a measure of the duration and degree of hyperthyroidism not appreciated previously. A clearer conception of the circulatory demands incident to augmented metabolism is obtained from the demonstration of periods of hyperthyroidism with its cyclic variation. Even though the intensity of the process may not be great its duration into the period of old age and organic heart disease gives a reasonable physiologic basis for the provocation of auricular fibrillation and the possible acceleration of the development of organic heart disease.

To aid in the recognition of the stages of hyperthyroidism, it should be emphasized that the toxic adenomatous goiter may have a sub-clinical stage before the manifest toxic symptoms appear.

It is appreciated that careful study of so-called subclinical cases will often establish manifest toxic adenomatous goiter, and it is hoped that such emphasis may aid in the earlier recognition of hyperthyroidism.

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C A S E R E P O R T S

DEXTROCARDIA WITH AURICULAR FIBRILLATION*

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Dextrocardia is fairly common, judging from the textbooks and current literature, though the subject is usually dismissed with a scant paragraph or a short article. However, the average general practitioner sees very few of these cases during a lifetime of medical practice. This interesting phenomenon should arouse more scientific interest as to its causation and its relationship to embryological development. When one discovers a case of this type and especially one associated with disease often found in the normally situated heart, it is one's duty to report it to the profession as a matter of scientific interest. As far as we have been able to find, our case of dextrocardia with auricular fibrillation is the second one reported in recent years.

Congenital right sided heart occurs usually as a part of a general transposition of all of the viscera, the true "situs inversus." Rarely is the heart alone transposed. In some, there is a congenital malformation, due to lack of development, in which the heart remains on the right side with a torsion of the great vessels and a defect in the cardiac septa. There are then some definite symptoms of cardiac dysfunction, such as cyanosis and distress occurring throughout the life of the individual. This is not the case in true situs inversus, for the individual may live normally to old age without the anomaly being discovered. In the case of situs inversus reported here, the patient was sixty-one years of age, and had always been well until a severe attack of diphtheria at the age of fifty-four had caused cardiac damage, and he had been forced to consult his physician for relief from his distress.

There is another type of dextrocardia, which must be recognized. It is the "simple dextroversionicordis," in which the heart is displaced to the right by some pathologic process in the chest. Here is where the electrocardiogram is of great value. The true (mirror picture) dextrocardia produces a characteristic form

of electrocardiogram that is pathognomonic. Lead I shows an inversion of P, R, and T, while Lead II and Lead III replace each other. If the poles be reversed, a normal arrangement of the complexes will appear. This inversion does not occur in dextroversionicordis or a congenital dextrocardia, due to arrest of development. Obviously, the reason is that in the two latter conditions, the direction of the electrical currents is not reversed from the normal, as it is in true dextrocardia.

As may be seen later in the case report, the response of the heart to treatment in true dextrocardia is the same as that in the normally situated heart.

CASE REPORT

G. R., male, aged sixty-one, a farmer by occupation, came to our office for examination on July 20, 1932. He complained of dyspnea and orthopnea, and a sense of extreme fatigue on exertion. He stated that his pulse had been rapid for many years, or ever since an attack of diphtheria, which had been incurred seven years previous to date of examination. He attributed his trouble to the large doses of antitoxin given at this time. This, of course, was erroneous. The symptoms that gave him distress had begun about three months previous to examination. He had been treated by several physicians, but his anomaly had never been discovered.

Physical examination disclosed a lean, muscular man, about 5 feet, 10 inches in height, weighing about 150 pounds. Breathing was labored and the great vessels of the neck pulsated visibly. There was a small adenoma in the right lobe of the thyroid. The lungs showed some congestion at the bases, but were otherwise normal. His blood pressure was 130-100, blood Wassermann negative. Blood and urine examinations revealed nothing of importance.

The heart was found to be much enlarged to the right. The pulse rate was about 150 beats per minute and there was a total arrhythmia. A precordial thrill was felt to the right of the sternum. An electrocardiogram was taken showing auricular fibrillation and an inversion of R and T in Lead I. The patient refused x-ray examination at this time. He was given digitalis in appropriate dosage, and ordered to rest in bed for a few days. He was requested to return in about a week, but did not return until October 10, about three months later.

On this examination, there was very little improvement in his condition, except that he had less orthop-

*Read before the annual meeting of the Southern Minnesota Medical Association, New Ulm, Minnesota, September 25, 1933.

nea. The pulse rate was about 130 per minute, and the auricles were still fibrillating. On account of the first physical findings, and the peculiar electrocardiogram, we suspected a dextrocardia. X-ray examination was insisted upon and our suspicions were confirmed. A

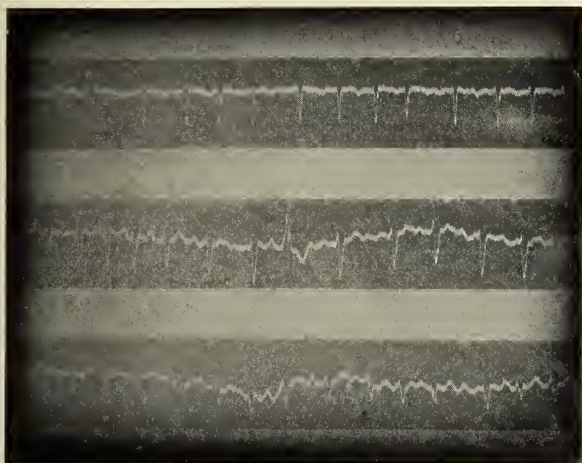


Fig. 1. Electrocardiogram showing absence of P waves and inversion of R and T waves in lead I.

barium meal was given and the stomach was found to be on the right side also. This practically established the presence of a complete "situs inversus." An x-ray film was taken at six feet. Cardiac measurements showed a definite enlargement, the total cardiac diameter being 18 cm. and the chest diameter 27.5 cm.

The patient was then given quinidin sulphate cautiously. Marked improvement resulted clinically, and the pulse rate dropped to 80 per minute in about a month. On February 4, 1933, the date of the last examination, the blood pressure was 150-80 and the pulse

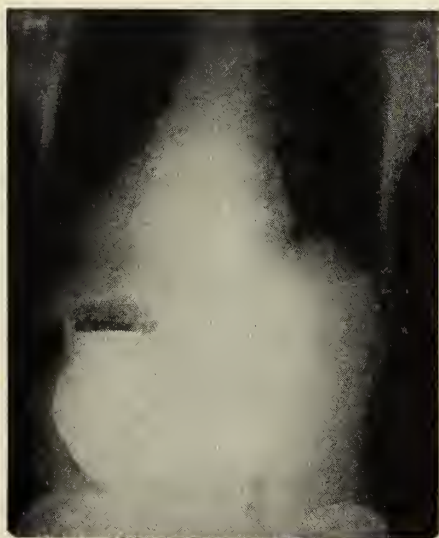


Fig. 2. Six foot film of breast showing dextrocardia.

had fallen to 64. The auricles were still fibrillating in spite of the quinidin medication. The dyspnea and orthopnea, however, had ceased and the patient was quite comfortable.

INTRACARDIAC EPINEPHRIN IN APPARENT DEATH*

C. L. FARABAUGH, M.D.

Owatonna, Minnesota

In the January 11, 1930, issue of the *Journal of the American Medical Association*, there appeared an editorial under the title, "Resuscitation and Intracardiac Injections," in which the author, after discussion of a report of a group of experiments on animals, made the following statements: "The evidence seems conclusive that, if the patient revived after such an intracardiac injection, he would have revived without it"; and further, "The conclusion to be drawn from these facts is clear and decisive. Intracardiac injection is not a justifiable means for resuscitation."

Since resuscitation is, by definition (Stedman's medical dictionary), "restoration to life after apparent death," it seems unreasonable to say that any effort at resuscitation is unjustifiable. If the physician has no alternative but to attempt to console the patient's family while fumbling in his pocket for a pen with which to sign a death certificate, and if there is any infinitesimal chance of restoring heart action by any means whatever, then it is not only justifiable but imperative that he make the attempt.

This report is not an attempt at an exhaustive review of the subject of intracardiac medication—though the literature furnishes good evidence that it is justifiable as a means of attempt at resuscitation, but an effort to record the evidence derived from experience with three cases which seem to have been suitable for this method.

Case 1.—The patient was a male child eighteen months old, normal in every respect except for a phimosi and adherent prepuce. A circumcision was begun in the office under chloroform anesthesia. A few minutes after commencing the operation the patient suddenly collapsed. The respiration and pulse ceased, the child became deathly pale, and no heart tones could be detected by auscultation. The stethoscope left a depressed ring on the chest wall. Massage and compression of the chest wall failed to produce any effect. A period of two to four minutes was required to prepare a hypodermic syringe with a dose of epinephrin. This was injected through a five-eighths inch needle between the ribs in the region of the apex of the heart, the needle being plunged perpendicularly as deeply as possible. In a few seconds after the injection was made, the pulse became palpable and apparently normal, color returned to the skin, and after a few moments of artificial respiration breathing was reestablished and became normal at once. The operation was completed without further anesthetic and the patient treated post-operatively as if no accident had occurred, except for careful observation of temperature and heart action. These remained normal and convalescence was quite satisfactory. The patient was under observation at intervals for two years and continued well and normal.

Case 2.—The patient was a man, about fifty years of age, who for some time had been a patient of Dr. C. E. Henry of Minneapolis, and had been diagnosed as having hypertension. In April, 1929, I was called to see him in haste, being told that the patient had suffered a "stroke." When seen, about fifteen minutes later, the patient was found lying on a bed apparently dead. The parish priest, who was in attendance, said the patient had been dead for some minutes. A rapid examination revealed no sign of animation. Pulse and respiration were entirely absent. The skin was completely pallid, and retained the marks of the stethoscope. The pupils were widely dilated.

*Read before the annual meeting of the Southern Minnesota Medical Association, New Ulm, Minnesota, September 25, 1934.

One-hundredth grain of epinephrin was injected quickly in the region of the apex of the heart in the manner described in Case 1, a one inch needle being used, and again in a few seconds the pulse became palpable, color returned to the skin and the pupils partially contracted. Artificial respiration was instituted and continued. The patient was sent to a hospital under Dr. Henry's care, where he lived eighteen hours under artificial respiration. The death report—there was no autopsy—gave the cause of death as "paralysis of the respiratory muscles, probably due to cerebral hemorrhage," and the contributory cause as "hypertension, probably of long duration."

Case 3.—C. S., a male aged 43, an engineer employed at night, returned from work on the morning of December 2, 1929, feeling as usual. At about 2 p. m., after shovelling snow from the sidewalk, he came into the house and fell unconscious to the floor. A neighbor who arrived a few minutes later said that when he came in the patient was "working" his extremities convulsively, bringing his hands up to his face and spasmodically contracting his facial muscles. The patient survived this attack and was carried to a bed, where he was able to talk for a while. During this period he told the neighbor that he had experienced precordial pain at times previously. A few minutes later he again collapsed, became unconscious and ceased breathing. When seen shortly afterward, the patient was lying on a bed, apparently dead. Respiration and heart action had ceased. There was no sign of animation. An attempt to give epinephrin by intracardiac injection failed because the needle was accidentally broken. Artificial respiration was instituted at once, but the heart failed to resume action. After about another twenty minutes, when the city hospital ambulance arrived, epinephrin was injected into the region of the heart, with no response. This was, however, fully thirty minutes after respiration had ceased, and twenty minutes after examination had failed to reveal heart action. An autopsy

was performed at the instance of the coroner's office and the pathological diagnosis was "coronary sclerosis."

COMMENT

In the first case described, that of chloroform poisoning, it seems quite evident that the injection of epinephrin into the region of the heart saved the child's life, and that probably no other available means could have done so.

In the second case, that of cerebral hemorrhage, life was evidently prolonged for a period of eighteen hours. If the condition which caused the suspension of animation had been one which in itself was not inconsistent with continued life, this reprieve of eighteen hours would have permitted the administration of treatment necessary to induce recovery.

Such a condition probably existed in the third case (coronary sclerosis). If death in this case was caused by spasm of coronary vessels already partially closed by sclerosis, it is to be assumed that the suspension of animation was followed by relaxation of the coronary, as of other, vessels. If, now, the injection of epinephrin had been administered promptly, it seems probable that this patient might have been resuscitated.

It may be objected that there is no evidence in the above case reports that injection was actually made into the heart. In fact no serious attempt was made, by withdrawal of blood, to determine whether this was the case. But, whether the drug is injected into the heart chamber, or into the heart muscle, or only into the region of the heart, is not important. It is the result that counts.

CONCLUSIONS

Intracardiac injection of epinephrin is not only justifiable but imperative in the attempt to resuscitate a patient apparently dead, especially when there is no evidence of disease inconsistent with life.

It is essential that the physician have this drug ready for use at all times in case of emergency.

EDITORIAL

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BUSINESS MANAGER

J. R. BRUCE, Saint Paul

Volume XVII APRIL, 1934 Number 4

Hennepin County Campaign for Early Diagnosis of Tuberculosis

Physicians in Minnesota will be interested in a new offensive in the long fight against tuberculosis which will be launched by the Hennepin County Tuberculosis Association when it conducts its seventh annual spring Early Diagnosis Campaign, April 20 to May 1, 1934. Using the spectacular symbol of a blazing ship, with the slogan: "Tuberculosis Spreads Like Fire—Stop It Before It Destroys," the campaign will attempt to focus public attention on the importance of discovering tuberculosis in an early stage.

In the six previous Early Diagnosis Campaigns, the National Tuberculosis Association and its branches have educated the public to the fact that a continuous tired feeling, loss of weight, a cough that hangs on, indigestion, pain in the chest, and spitting of blood indicate tuberculosis. This has created a false sense of security. Unfortunately, the public has not been aroused to the fact that tuberculosis is an early stage rarely produces characteristic symptoms,

and that by the time these well known symptoms do appear, the disease is in an advanced and frequently fatal stage.

This campaign will emphasize the fact that discovery of tuberculosis in an early stage is possible by means of the tuberculin test and x-ray examination. That the tuberculin test is a painless, harmless and accurate procedure. That, until it is positive, it should be a part of every regular physical examination. That there are thousands of people who have early tuberculosis now, who look and feel perfectly well, whose condition could be quickly determined through these diagnostic aids if they would consult their physicians. That the discovery of these cases of tuberculosis while they are still in an early stage would save the patients many months of sickness, if not their lives, and would protect their families and associates from exposure to infection.

It is anticipated that Hennepin County physicians will give this campaign their whole-hearted coöperation. Several months ago the Hennepin County Tuberculosis Association supplied each member of the Hennepin County Medical Society with a tuberculin syringe, and since then has delivered to each physician a fresh supply of Mantoux testing material every two weeks. Now the Association is going to make every effort to get people to their physicians for physical examinations, including tuberculin tests and x-rays, if necessary.

Physicians can help by being ready to give the Mantoux test, recommending x-rays to those who have positive reactions; and also, by further impressing on the minds of their patients the importance of regular physical examinations, the tuberculin test, and the x-ray in preventing deaths from tuberculosis.

N. O. P.

Arteriosclerosis

Somewhere it has been said that we begin to die as soon as we are born. If arteriosclerosis is a sign of degeneration the truth of this observation is rather substantiated by some observations made by Willius and his associates.²

Arteriosclerosis has always been considered an



aging process, which it is. In elderly individuals we expect to find atheromatous plaques in the aorta and peripheral arteries at autopsy even though their presence may not have been evident during life. Usually such changes have little to do with the cause of death. Not infrequently we are able to find clinical evidence of arteriosclerosis in middle life and very occasionally in childhood. But that any appreciable percentage of individuals taken at random have degenerative changes in the aorta and coronary arteries during the first decade of life is news to most of us.

In a review of over 5,000 autopsies the authors determined that even in the first decade of life a slight atheroma of the coronary arteries was present in 10.5 per cent of those examined. The same slight change was noted in 43.3 per cent of those in the second decade and 72.6 per cent in the third decade. The percentage increased in subsequent decades until by the age of sixty practically all (99.7 per cent) had evidence of coronary sclerosis.

Evidence of atheroma of the aorta in these routine autopsies was even more startling. In the first decade 23.9 per cent showed its presence; in the second 79.4 per cent; in the third 90.8 per cent; by the seventh decade all showed atheromatous changes.

The obvious conclusion to be drawn from this study is that minor atheromatous changes in the coronary arteries and aorta do not produce symptoms and are negligible.

A further contribution to the subject of arteriosclerosis appeared in the same publication¹ last January.

Even since Beck first demonstrated in 1898 the calcification of peripheral arteries by x-ray, the method has been extensively used to determine the degree of changes in the arteries. It has been presumed that the greater the degree of calcium deposit in the arteries as shown in the roentgenogram the greater the interference with function. The x-ray has been used in determining the level for amputation in diabetic gangrene of the lower extremities.

The author, Lansbury, has compared roentgenograms of individuals without clinical symptoms of obstruction in the arteries as controls with those of individuals suffering from arteriosclerosis obliterans and thromboangiitis obliterans. He found that the controls had x-ray evidence of calcification in nearly as high a percent-

age of cases (69 per cent) as the arteriosclerosis obliterans with obstructive symptoms (85 per cent). The difference in incidence is not sufficient to make the x-ray of clinical value in determining interference with function. X-ray evidence of calcification in the thromboangiitis obliterans occurred much less frequently (14 per cent) than in the control series. The author concludes that "no prediction of value as to the presence of occlusion can be based on the degree of calcification present."

Apparently x-ray is of little value in determining interference with arterial function and we are forced to obtain evidence of this disturbance by other clinical methods such as absence of pulsation in palpable arteries, appearance of extremities and temperature of the skin.

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2. Willius, F. A., Smith, H. L., and Sprague, P. H.: A study of coronary and aortic sclerosis: incidence and degree in 5,060 consecutive post mortem examinations. Staff meetings of Mayo Clinic, March 1, 1933.

Medical Economics

For a number of years it has been generally felt that not enough space in MINNESOTA MEDICINE was being devoted to the subject of Medical Economics. This failing has been due in large part to insufficient editing personnel.

After thoughtful consideration of ways and means the Council of the Minnesota State Medical Association recently made the recommendation that the chairman of the Committee on Medical Economics of the State Association be appointed Assistant Editor of the journal and that he, with the assistance of the other members of his committee, supply material of economic interest for publication in the journal and have editorial responsibility for such material.

Dr. William F. Braasch, chairman of the Committee on Medical Economics for 1934, has been appointed Assistant Editor, and he and the other two members of his committee, Dr. B. J. Branton and Dr. J. C. Michael, will supervise material of medical economic interest appearing in MINNESOTA MEDICINE.

MINNESOTA MEDICINE welcomes the assistance of Dr. Braasch and his committee in supplying this material which appears for the first time in this number of the journal under the heading "Medical Economics."

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association

B. J. Branton, M. D.

W. F. Braasch, M. D., Chairman

J. C. Michael, M. D.

A New Department Makes Its Bow

National recovery has not diminished or reduced the social and economic problems of the medical profession. The dilemmas of depression are now giving way to the equally troublesome dilemmas of recovery.

If the post-depression outlook for medical practice is rosier, it is because a little cash in the hands of the hard-pressed medical profession will perhaps free it for a more careful consideration of these post-depression dilemmas, all of which are well supplied with horns on which to hoist and destroy the unwary.

There is, for example, the problem of returning from the free clinics to their family physicians, the men and women who were temporarily unemployed and out of funds.

There is the problem presented by the man of small means who is so often said to be swamped by the expense of medical and hospital care in times of serious illness and the necessity for expensive operations. It is on behalf of this man that the lay reformer of medical practice may be expected to make his strongest appeal. The physician, also, wants to help this man.

There is the problem involved in the increasing reliance upon government aid and government services in all departments of life: in home ownership; in protection for savings; in planting of crops; in control of markets and prices and in regulation of employment.

There is the problem of industrial insurance and compensation.

No Fault of Theirs

Medicine, alone, among the necessities of life, has thus far been exempted from specific government intervention, and through no fault of the majority report of the Committee on Costs of Medical Care or the continuous propaganda since publication of that report by certain philanthropic foundations who propose a regimented group practice of medicine with general insurance schemes to support it.

In the opinion of some thoughtful observers, like Dr. Fay, the present exemption in favor of the private practice of medicine should be regarded as temporary and likely to be withdrawn whenever it appears to any considerable number of legislators or government officials that physicians are not capable of handling the business of caring for the sick.

Some form of insurance medicine will undoubtedly be the first recourse of lay and legislative reformers then. But insurance medicine has not proved itself

successful enough in Europe to recommend it to American physicians for trial.

The medical profession has its chance NOW in America to tackle and solve the problem of providing, under its own leadership, adequate care in sickness and adequate instruction in disease prevention *under its own direction* for the great mass of people.

Beginning with this issue, a few pages of MINNESOTA MEDICINE will be set aside each month, at the request of the Council of the Minnesota State Medical Association, for discussion of these and other problems of economic interest.

Action of the Council

"That an economics editor be appointed to assist the editor and to supplement his activities. In this connection, it is further suggested that the chairman of the Committee on Medical Economics, with the assistance of his committee, is the logical person for this position."

The members of this committee are: W. F. Braasch, Rochester, Chairman; B. J. Branton, Willmar; J. C. Michael, Minneapolis.

This month's section is to be devoted largely to excerpts from the very important papers presented at the Northwest Medical Conference held in Saint Paul, February 25, 1934. Action and policies of organized medicine bearing upon medical economics here or in other states will be reported in this section from time to time. Pertinent communications from members will be welcomed also and given editorial space whenever possible.

It is the object of the Committee on Medical Economics to make these pages interesting, provocative, informative, and an instrument in Minnesota for the crystallization of our social and economic policies and aspirations.

From the Northwest Conference

Representatives from nine north and middlewest states attended the Northwest Medical Conference. More than sixty men were present in the course of the day-long sessions, all of them officers or committee chairmen of state medical organizations. The discussions were thoughtful, pertinent and prevailingly devoted to the social problems of medicine in these times.

The following excerpts are regarded by the committee as especially worthy of attention.

* * *

From a paper entitled "The Function of the Physician in Public Health Education" by W. W. Bauer, Director, Bureau of Health and Public Instruction, American Medical Association, Chicago, read by R. G. Leland, Director, Bureau of Medical Economics, American Medical Association, Chicago, Illinois.

Education or Propaganda?

There are evidences within the medical profession of a tendency toward embracing paid advertising for educational purposes. Commercial interests outside the profession with advertising service to sell—I mean specifically newspapers and the radio—will not be slow to take advantage of openings thus created. In my judgment, this is an unfortunate tendency. The material which is being offered the public by the medical profession is education, not advertising. It is not primarily in the interest of the doctor, but in the interest of the patient, and it is therefore entitled to a place in the columns of the press and on the schedule of radio stations along with other educational matter which these media regularly feature. *There is no more reason why the medical profession should pay newspapers and radio for the dissemination of health information than there is for mathematicians to pay for the teaching of arithmetic in the public schools.*

Aside from ethics and consideration of public services there is another aspect to health education in paid advertising space. When space is paid for, the material, whatever its educational value, ceases to be educational and becomes propaganda. There is a great deal of information about health published in paid advertising space by the Metropolitan Life Insurance Company. Considered purely as health education, this is very high grade matter and constitutes a distinct and valuable contribution to health education. Perhaps its greatest value lies in the commendable frankness with which the company acknowledges that this type of advertising and the other health and welfare activities which supplement it have been a profitable activity. We need not discuss the motive behind it, but may assume that it is partly commercial and partly philanthropic. Recognizing its value and implying no criticism of the technic, I still believe it would be unfortunate if the medical profession were to adopt this particular means of educating the public in health. The use of paid advertising space by organized medicine has been discussed by Fishbein, who concluded that those medical groups who have tried it have, if their failure to continue it is an indication of their experience, found it unsatisfactory.

* * *

From a paper entitled "The Test of Organized Medicine," read by Oliver J. Fay, Des Moines, Iowa, Chairman Board of Trustees, Iowa State Medical Society.

Haloes

We of the medical profession dare not assume that this method [for FER and CWA] of caring for the injured is a closed issue. There is nothing permanent,

nothing unchangeable, about the present federal regulations. If tomorrow the government should find that certain physicians are failing to live up to the spirit of the hippocratic code, it can provide new regulations. It can take over the entire medical work of the various units under its control, and, by arranging to have their work done by salaried government employees, it can go far towards establishing state medicine on a permanent basis. At the risk of appearing old fashioned I must confess that I can see little to be gained and much to be lost by the extension of communism to the scientific fields, in other words, by turning the practice of medicine over to the state. Yet a relatively small number of physicians, who through petty greed fail to play fair in their handling of federal cases, may precipitate the issue of state medicine. In brief, you and I, the members of the medical profession as a whole, are at the mercy of the individual physician. The question of whether you and I are to be permitted to continue as free members of a great profession, or are to become mere cogs in the machinery of state medicine, depends upon whether each and every member of our profession is willing to play the game. Unless we are mere visionaries, we must admit that there is no large group of humans, in or out of the medical profession, that are 100 per cent perfect. We must face the fact that there are always those who are willing to seek personal profit at the cost of group welfare, who are tempted to betray their profession for a mere handful of silver. We as individuals are powerless in the face of such betrayal. In childhood's fairy tales, right always triumphs, but in a world of cold realities, we often see its colors dragged in the dust because those who should champion its cause sit idly by in supine anticipation of some eleventh hour miracle. The problem can be coped with only through organization, through strong group control. There is nothing new nor revolutionary about the idea of group activities and control. Industry has long recognized the value of the principle, and under the new régime it is assuming even larger proportions. Only we of the medical profession have desperately tried to hold on to our haloes, to convince those about us by assuring ourselves that there is something otherworldly about the physician and his profession, that for him alone natural laws are abrogated, that his profession alone is not subject to the fundamental laws, such as that of supply and demand, that govern all other human activities.

* * *

From a paper entitled "Problems Connected with Compensation Insurance," read by Roy Fouts of Omaha, Nebraska.

A Most Distressing Problem

The injustice to the badly injured workman and the unfairness to the physician, who is so unfortunate as to come under the provisions of a law that does not provide adequate treatment or a reasonably just recompense for the same, must be evident to everyone. Such a law practically precludes proper hospitalization and treatment for a serious injury. Fortunate indeed are both patient and physician where no limit is placed

upon the amount expended to rehabilitate the injured workman and return him to Society as a useful citizen in the shortest possible time.

I appreciate the fact that there are too many abuses of a no-limit medical expense by members of our profession and I have seen not a few instances of this kind. However, since the creation of a Medical Advisory Board to the Labor Commissioner in Nebraska in 1929, they have become less and less and today we rarely have a medical bill submitted for review.

One of the big problems in connection with Compensation Insurance cases is to sell the medical profession on the idea that it is our duty to return the injured workman to some sort of useful employment in the shortest possible time. This will require the fullest coöperation of the employer and he should be educated to know that periods of disability are shortened if the injured man is permitted to return to some form of light work at the earliest possible time. Too many employers take the stand that they do not want the man on the job until he is able to do a full day's work. On the other hand the workman is afraid to return to work for fear he will lose his job on account of his inability to do a full day's work. Physicians treating this class of cases should assume the rôle of the "liaison officer," for employer and employee, to the end that each may understand the other, and both the problem involved—that of rehabilitating the injured workman.

Many compensation cases following a period of extended disability become serious sociologic problems, and present a problem even greater than determining the amount of disability: that of rehabilitating the injured man and returning him to Society as a satisfied and self-supporting unit. Every effort should be made to encourage the injured man to return to work if his condition warrants, and to sell him on the idea that the compensation he is drawing represents wages, and in no way is regarded as pay for damages sustained as a result of his injury. If this idea can be sold to the medical profession and they in turn resell it to the injured workman, much will be done toward alleviating one of Compensation's most distressing problems.

* * *

From a paper entitled "Economic Trends and Their Influence on Medical Economics," by R. K. Packard, Chairman of the Council, Illinois State Medical Society, Chicago, Illinois.

By Being a Better Doctor

The fact that there are no more new frontiers, either agriculturally or industrially, means that the new medical graduate today has no new community to develop a practice in, but must open his office not only in competition with older men, but in competition with the various forms of contract practice, university clinics, charity hospitals, lay controlled groups, and long established pay clinics. In many instances, he is forced against his judgment and ethics to engage in one of the forms of practice outside of private practice, because of economic necessity.

Advertising has had its peculiar effects upon medi-

cal economics in that it has created a distorted sense of value, and those products best advertised have taken first place in purchasing power. Medical care, not having been featured from the housetops, has taken its place in the lower bracket of these distorted values. Unethical institutions have taken to the field of commercial advertising, again distorting the value of competent medical service.

The machine age has rendered man's ability to earn a livelihood when he passes middle life more difficult, and, not having accumulated an income estate, he must become an object of charity, not only for medicine, but for food, clothing, and shelter or, as has happened in twenty-six states, social legislation must provide an old age pension.

The increased cost of furnishing proper medical service because of the advancement in medicine and surgery itself has only added to the inability of the industrial classes to pay for it.

And last, we find in our present depression, the federal government appropriating money for the payment of doctor bills. This cannot be considered an evil if it can be ended definitely with the end of the depression.

The economic evils of contract practice, corporate practice, insurance practice, public health departments, and private group contract organizations have all been the outgrowth of general social, industrial and political tendencies through a period of the last 120 years, and that one who seeks for an immediate solution of these problems has only to review the causes that have developed through time to be convinced that we have no immediate solution for a number of them.

With frontiers gone, with admitted industrialization, with technological unemployment, with all the various forms of practice now established, with social legislation on the increase, one can only say that we need better medical coöperation. *The individual practitioner must meet his competition by being a better doctor*, by coöperating with organized medicine, to the cure of those evils that are amenable to treatment.

* * *

From a paper entitled "Medical Care of the Indigent in Wisconsin During the National Emergency," read by Mr. J. G. Crownhart, Secretary of the State Medical Society, Madison, Wisconsin.

Abolishing Forever the "Poor Physician"

We look forward to the time, not when we may receive 100 per cent minimum fees from federal funds, but when we may translate our experience (in the operation of emergency medical relief) into working agreements with each county, when such counties again are on a self-sustaining basis. By so doing we hope to abolish forever that relic of Dickens' time—the county or city poor physician who could not render the service in fact, who was generally inadequately paid for what he did, and who everywhere satisfied the conscience of officials rather than the needs of the community and the individuals who required the service.

There will be those who may wish to see the federal grant perpetuated. While we sense keenly the

need that it presently fills we would point out that its perpetuation could only signify to legislative officers that we were satisfied with the schedules for our care of twenty per cent of the people. Therefore, they might well ask, why not five times the amount for care of the entire population?

In this entire situation we have had a demonstration not of any breakdown in the institution of medicine as it has been built these many, many years. The emergency has demonstrated conclusively, however, that all that has been said of the evils of a state system of medicine has not been over-emphasized. Hospitalization has been denied if the government was to pay any part of it. Medical service was to consist in keeping the patient alive,—not necessarily in keeping him well. Prevention has played little part in the program. Directors have been laymen unacquainted with any part of the real problem that physicians face daily. Directors have been under a political system and, while the emergency has pushed this to the background, you have probably sensed what would happen in any normal time. Directors have been responsible first to the government fiscal agencies and not at all to the needs stated by the physician.

We, in Wisconsin, have found a very coöperative desire and spirit on the part of administrative officials. For this we are grateful and most appreciative. We pledge our best efforts for the future *but we have had all the federal medicine that we need to demonstrate that it is no system which will promote in any normal time the delivery of either an adequate or a scientific medical service for our people.*

County Officers' Conference

Abstracts of talks and proceedings of the County Officers' Conference have been sent from the State Office to all secretaries. Each secretary will, it is hoped, bring this account of what happened before his membership as soon as possible; otherwise, nine-tenths of the good of a good conference will be lost.

A total of 100 attended, including many who were not officers—just interested members—a large representation from the Iowa State Medical Society and other interesting visitors.

At breakfast secretaries and state officers compared notes informally. Many a secretary spoke his mind freely about his difficulties and his plans.

A crowded program covering many important administrative and medico-social and economic matters occupied the morning.

At luncheon there was a new face at the speakers' table, an interesting young state official, Mr. Elmer A. Benson, who gave an encouraging and politically important review of banking conditions in Minnesota.

In the afternoon state officials in charge of FERA and CWA, including Mr. F. R. Rarig, head man, also physicians experienced in the medical phases, talked and answered questions. The program also included a review of the legislative situation in Washington and Minnesota and of needed amendments to Minnesota's Medical Practice Act.

Many of these matters came up before the Council which met after the adjournment.

For Minnesota's Isolated Communities

Do you know that a form of State Medicine exists in our very back yard, in the neighboring provinces of Northwest Canada?

Under what conditions was this thought necessary and how is it working out?

Why wouldn't some such system be feasible in the sparsely settled districts of Northern Minnesota?

The following condensed report of the Committee on Medical Care in Isolated Communities has the answer. Read it carefully.

Reports having reached our State Medical Association from non-medical sources that inhabitants of some parts of northern Minnesota are suffering from lack of available medical service, a meeting was called at Grand Rapids by Dr. F. J. Savage, our President, on Sunday, February 11, 1934. The purpose was the procurement of information from doctors in the region regarding the true state of affairs and the proposal of whatever plan for care might be deemed useful if needed at all.

It was demonstrated that with the present good roads there is practically no group of people in northern Minnesota which is inaccessible to medical service and that places far from doctors have only an occasional occupant. Case reports from Federal Dam and from the district north of Brainerd proved upon inquiry to be cases, not of neglect by doctors but cases of self-neglect by the patients. (They failed to call a doctor at all or did not follow his advice.)

Doctors were well distributed and there was no complaint of lack of medical care before the depression. The depression has increased the load due to increased indigency and it has reduced tax money of the counties so that physicians are getting very little either from public or private funds.

That being the case, doctors in some more sparsely settled districts are living under such difficulties that many are considering moving in order to find another locality in which they will be able to make a living. The State Association has previously suggested an arrangement between local medical societies and local authorities for more even distribution between doctors of the load and recompense for care of the indigent. However, in the present difficulties of the counties in the northern part of the state, it has apparently been almost impossible to give the physicians in those districts a proper living.

Through the Committee on State Health Relations, Dr. Savage had obtained data about medical service in Saskatchewan and Alberta, where, at first sight, conditions would appear similar to those in northern Minnesota. In Saskatchewan there are 35 communities which are supplied with medical care by tax-supported physicians. The contracts between the communities and the physicians vary more or less but in general the physician is allowed to charge a nominal fee for his initial call an additional fee for each obstetric case or fracture. Here is State Medicine at our doorstep.

On further study, the committee found that our situation, due to the good roads and better distribution of doctors, was quite different. Everyone present was definitely of the opinion, however, that the plan for importing state-paid resident or itinerant physicians was not practical in Minnesota. The situation in Minnesota is different from that in the provinces of western Canada in that, in normal times, the number of indigents is comparatively few. Various plans were suggested by the committee for use of Federal or State relief funds or CWA funds to insure the continued residence of these doctors in their localities.

Those present seemed to think that if some legislative power would compel the counties and townships to pay for medical and hospital services for their indigent, the situation would be taken care of in the best possible medical manner and at the same time would be most economical.

* * *

What Is the Solution Here Proposed?

1. An arrangement between local medical societies and local authorities for more even distribution of the load and recompense for the care of the indigent.

2. Some legislation which would compel the counties and townships to pay for medical and hospital services for their indigent.

3. Use of federal or state relief or CWA funds to insure the continued residence of these doctors in their localities.

Should it be an obligation on the part of the state to care for the indigent sick if the county is financially unable to do so? Could an agreement be made between the county medical society involved and the state for remuneration? It is to be understood that the financial obligations toward the physician should be resumed by the patient when the latter is financially able to do so.

Important

All physicians who have registered their willingness to care for FERA beneficiaries or employees of the CWA and CWS, please note:

At the date of going to press (March 19) all but eleven Minnesota counties were organized for relief under the new Relief Works Administration plan which is absorbing CWA and CWS projects in the state.

Under the new plan only those on the relief lists will be employed in contrast to CWA and CWS projects in which 50 per cent were employed from the relief lists and 50 per cent from the lists of unemployed who were not on relief.

These relief beneficiaries will be given employment in exchange for relief and the work will be budgeted in the case of each worker by the Local County Relief Worker according to his needs and the needs of his family.

Among workers and their families, thus, medical care will be on the same status as other necessities of life and the need for it and the amount to be paid for it allocated by the Relief Worker in the same way as the amount to be paid for food is allocated.

In case of illness of a worker or a member of his family, therefore, the Relief Worker will make an estimate based upon the rates agreed upon locally between the physician and Relief Administration of the amount of money to pay for medical care. The worker himself will be paid the money, which he must, in turn, pay to the doctor.

The worker will not be given more money or more work than is adjudged necessary to keep himself and his family.

For those who are on relief and are not, themselves, workers and have no one in the family who is a worker, medical care will presumably be paid for by the County Relief Worker as before, according to regulations of the bulletin "Medical Care in the Home."

Injuries to RWA workers will not be cared for under the United States Employees' Compensation Commission regulations which applied to CWA employees.

According to the latest information from state headquarters, RWA workmen who are hurt in the course of their employment will be cared for under local workmen's compensation laws.

One Hundred Years!

In Rochester, Minnesota, lives the oldest practicing physician in the United States. He was a member of the Minnesota State Medical Association when that little body of pioneers was just struggling to re-organize after the Civil War. He began to practice medicine eighty-three years ago in Plainview, Minnesota, and for sixty-two years he has been in the same second story office of the ancient red brick building on Rochester's Broadway that he occupies now. He was one hundred years old on March 6, 1934, and hundreds of his colleagues and patients and friends called and wrote and telephoned to offer well deserved congratulations. Among them was President Roosevelt, and the Hon. Frank B. Kellogg of Saint Paul.

Dr. W. A. Allen has seen hard times come and go. First he rode horseback on his calls over Minnesota trails. Later there was a carriage and pair. Now he uses an automobile and drives it himself.

He has always been a member of his medical society. His dues are paid for 1934. Nor has he applied for Affiliate Membership in his society.

The Council Meets For the Board: More Power!

"During the six years that the State Board of Medical Examiners has been trying to exterminate quacks, we have all had a chance to learn something about the essentials of authority and equipment for the job," says F. Manley Brist, attorney for the Board.

"The Board should have the power to suspend and reinstate a license as well as to revoke it. Revocation of licenses is a grave punishment to be resorted to rarely. Suspension might be used more frequently with excellent disciplinary effect.

"The Board should also have the power to disqualify the candidate for licensure because of immoral character before—not after—he has taken his examination.

Under the present regulation he is allowed to finish his internship and pass his examination before the Board may pass upon his moral character and grant or refuse him a license.

"The Board has now the power to administer an oath but cannot force anybody to come before it. It should have the power, also, to subpoena a witness. The case of the Minneapolis physician to whom a cultist referred his patient is a case in point. The physician examined the patient at the cultist's request and endorsed the cultist. This physician should be brought before the board to tell his story.

"Itinerant practice should be better defined than it is at the present time. The question should be settled as to whether or not the practice of healing by a person who is not licensed should be subject to control by injunction. The right to practice medicine is in the nature of a property right—the court should have the right to protect in some fashion the holder of that right."

The Council agreed.

* * *

How Many Years?

Shall the age of eligibility to Affiliate Membership be extended or shortened? It is now seventy years. Shall Affiliate Membership entail twenty, twenty-five, thirty, thirty-five years' practice? Shall the membership in the society for that length of time be continuous?

These questions were discussed at length at the County Officers' Conference, Saturday, February 24, 1934, at the Lowry Hotel. They were discussed at length also by the Council. The upshot of it all was that a committee was appointed by Chairman H. M. Workman, Tracy, to study the whole matter and report. Members of this committee are: L. Sogge, Windom, chairman; W. W. Will, Bertha; and H. Z. Giffin, Rochester.

* * *

New Finance Committees

H. Z. Giffin, Rochester, is the new chairman of the Finance Committee of the Council. Other members are: W. W. Will, Bertha, and J. S. Holbrook, Mankato.

Chairman Giffin has divided up the duties of this over-burdened committee for the first time. He himself will study and supervise the accounts of MINNESOTA MEDICINE and the Fiscal Agency Account which represents the reserve fund of the association. Dr. Holbrook will supervise committee budgets and accounts. Dr. Will will supervise state office expenditures. The object: Better acquaintance with financial administration of the society, whose activities, particularly the committee activities, have branched out tremendously in the last few years.

* * *

Thanks

E. J. Engberg, Secretary of the State Board of Medical Examiners, thanked the Council on behalf of the Board for the \$3,000 placed at their disposal last year when it began to look as though the Board might be obliged to curtail its investigations of violators of the Basic Science Law and the Medical Practice Act.

"The Board has not used the three thousand dollars which was placed at its disposal and probably won't use it," Dr. Engberg told the Council. The fact that it was available, however, allowed them to proceed with important investigations which otherwise they would have ignored for fear of lack of funds. The work of the Board is proceeding without curtailment.

* * *

Needy Colleagues

Are there any indigent physicians? Have there been doctors in the breadlines, driving taxis for a living, dying in the pauper wards of big city hospitals?

W. F. Braasch has been investigating. He reported to the Council that some of the stories have been exaggerated. The breadline story originated in Detroit and seems to have no foundation in fact. The physician taxi drivers in New York turned out to be medical students. Two physicians actually did die in the pauper ward, however; and it was Dr. Braasch's opinion that many others have been and might be now in need of assistance. The Council instructed the state secretary to write to each county society secretary for facts concerning his colleagues in his own community. If it appears from these reports that there are men who need help, the Council will act.

* * *

Unethical?

An embarrassing by-product of federal payment of medical fees for the indigent is: the physician who advertises free medical service for those "in straitened circumstances and their needy friends."

In order to facilitate his participation in the medical phase of the FER, a Minnesota physician applied for membership in his district medical society almost coincidentally with the appearance of the following advertisement in the papers and the circularization of similar handbills:

Announcement

Until further notice, all persons who are in straitened circumstances and who are in need of MEDICAL SERVICES will be treated free at my office with no charge except for medicine and dressings furnished. Please do a kind act by telling your needy friends about this free service.

Yours very truly,
DR. _____.

Is such conduct unethical? Does it violate the Medical Practice Act? Is this doctor eligible to membership?

The State Board of Medical Examiners ruled that there was no violation of the Medical Practice Act. The state office held up the application for membership pending action of the Council upon ethics and eligibility. The Council laid the matter on the table pending official action of the district medical society.

The King Is Dead; Long Live the King!

The famed Dr. John R. (Goat Gland) Brinkley has left Milford, Kansas. What happens now to that thriving hospital center? Read this letter from Milford's enterprising Chamber of Commerce.

CHAMBER OF COMMERCE
MILFORD, KANSAS

A Noted Medical
Center of America
and Geographical
Center of the
United States.

H. Brighton, Pres.
C. E. Lacer, Secy.
At Your Service.

To the President of the
Chamber of Commerce
Dear Sir:

. . . Dr. Brinkley has removed to Del Rio, Texas, has torn down or dismantled his hospital buildings here and has announced that he does not expect to ever return.

Upon petition of a large majority of our citizens, Dr. O. M. Owensby, who was former Chief Surgeon for Brinkley's and who maintains a Prostate Sanitarium at Rosalia, Kansas, has opened up a Prostate Sanitarium here in a new building. Dr. Dragoo, who was also Chief Surgeon for Dr. Brinkley after the resignation of Dr. Owensby, is now associated with Dr. Owensby and is in charge of the Prostate Hospital at Rosalia, Kansas.

Drs. Owensby and Dragoo were residents of Milford for many months and we became well acquainted with them during that time and learned to respect them as very capable surgeons who are trustworthy, honest and reliable in every way and we unhesitatingly recommend them to all. . . .

THE MILFORD CHAMBER OF COMMERCE.
H. BRIGHTON, President.

The fight for honest medicine must go on.

Inter-Professional

An important medical economics meeting is scheduled for Crookston Tuesday, April 24, 1934.

This is one of a series of councilor district meetings sponsored by W. L. Burnap of Fergus Falls, Councilor of the Eighth District.

Dentists, druggists and public health nurses from all the surrounding country have been invited to the dinner, thereby giving the early part of the affair the character of an inter-professional gathering. These invited guests and the wives of the doctors will adjourn for another program while medical men listen to Dr. Burnap and to O. J. Hagen of Moorhead on medical and social problems. Harold Swanberg, editor of the *Radiological Review*, is expected to speak at the meeting.

Walter Judd, Fellow of the Mayo Clinic at Rochester, and principal speaker at the very successful meeting held at Fergus Falls March 13, will talk at the dinner and later to the guests on "Chinese Medicine, Ancient and Modern."

All doctors and their wives from anywhere in the state are invited to attend. Dinner is at 6 p. m.


President's Letter

THE idea of a regional conference in this section of the country was originated by Drs. Meyerding and Braasch, in 1927. Since then it has steadily grown. The 1934 meeting was notable in the variety of economic questions discussed.

The problems considered at the conference were all of an economic character and, among other items, included public health education by means of the press, radio, and lecture platform; the care of the indigent and what may be designated as the substandard financial patient; state medicine; medical problems resulting from Federal legislation and care of the mentally unbalanced.

One subject of particular interest to me had to do with the over-production of physicians. Dr. Fay of Des Moines made this statement: "The training of a greater number of medical students than the number needed to supply the medical needs of our population, undermines the foundation of sound medical practice, and violates every economic law." In the February issue of the *Bulletin of the A. M. A.* Dr. Biering, under the title of "Social Dangers of an Over-supply of Physicians," makes the following statement: "It is now well recognized that the academic record is no longer a determining factor in choosing medical students, and that the emphasis is rather on a combination of intelligence, character, personality, resourcefulness and adaptability. These selective and qualifying tests should begin with entrance into a pre-medical course, and the latter should be for a period of three years. The courses of instruction should be specially arranged so as to furnish a scientific and cultural background specially fitted for the student of medicine. The committee on selection and qualification should be under the supervision of the medical faculties. The standards of personal attainments should be on an equally high plane with the academic requirements."

In this connection it is of interest to recall that during the war the government adopted a system of rating medical officers somewhat as follows: (1) physical characteristics; (2) leadership; (3) administration and executive ability; (4) judgment and common sense; (5) general value to the service. Might not the medical guild, as represented by a faculty committee of the medical school, exercise a similar direction over pre-medical students, weeding out the unfit and the least adaptable, prior to admission to the medical school as in the army "for the good of the service." When enough medical men continue to think along these lines, we shall be approaching a solution of the problems.



President,
Minnesota State Medical Association.

Heart Committee, Minnesota State Medical Association

The Public Health and Heart Disease*

Two recent publications, one by L. I. Dublin on the "Favorable Aspects of Heart Disease,"² the other by Cohn and Lingg on "Heart Disease from the Point of View of the Public Health—1933,"¹ have indicated a more optimistic trend in relation to the mortality from heart disease. The analytical data are in contrast to the popular lay and medical theory that heart disease as a cause of death is increasing with "appalling" rapidity.

Attention is drawn to the apparent material increase in the death rate from heart disease in the original Area of Registration of 1900 consisting of ten states, *i.e.*, New York, New Jersey, Indiana, Michigan, those comprising New England and the District of Columbia. Restricting the data to this original Area of Registration offers several important advantages: (1) the record is the longest available in the United States; (2) it is representative of a similarity in climate and yet broad in its longitudinal scope, and (3) inferences may be drawn less likely sensitive to influences of medical thought and diagnostic patterns.

The death rate from the various infectious diseases including acute cardiac infections is shown to have decreased to a phenomenal degree. A few notable examples may be cited. In 1900 the death rate from typhoid fever in this area was 31.3 per 100,000 but in 1932 had receded to 1.1 per 100,000. The death rate from diphtheria has declined in the same period from 40.4 to 2.5 per 100,000 and that of tuberculosis from 195.2 to 58.7. Data on other acute infectious diseases are not so striking, yet very important and significant. Contrariwise the chronic diseases of later life have increased very markedly so that 60 per cent of all deaths occur after the age of forty-five and of these heart disease leads all causes with a rate in 1932 of 184.3 per 100,000 as compared to 111.2 in 1900. What do these data connote?

Needless to say, the increased life expectancy resulting from the saving of lives from the infectious diseases of childhood and early adult life has changed the age distribution of the population. In 1900 only 17.7 per cent of the population was over forty-five years of age whereas in 1930 it comprised 22.8 per cent. It may be stated more graphically that the population over forty-five has doubled in the last three decades while the general population has increased but 62 per cent. Hence, as has been pointed out, more of the population reach an age at which the degenerative diseases ensue. That this is not the sole or even the most important factor is proved by the fact that with the deletion of age and sex factors there is still an increase of 25 per cent in deaths from cardiac causes according to the statistical data. Deaths from cardiac disease before the age of forty have decreased progressively since 1900. That this is due to less acute cardiac disease and infectious processes is entirely tenable. Improvement in treatment and in "awareness" of cardiopathic possibilities also play a part. But there has also been a consistent lowering of deaths from acute infectious disease in the later decades so that in certain decades but not in others the increased death rate from heart disease has been neutralized. Cohn and Lingg state that if the rates from cardiovascular disease and the infectious diseases are added, the data in 1900 and 1930 attain close equilibrium.

In considering the "fashion" in diagnosis in the mortality statistics, changes in the diagnostic "rubric" of

disease have taken place in the last three decades. Levy has shown that in the Presbyterian Hospital in New York City the diagnosis of coronary thrombosis increased sharply after the publication of Herrick's papers. Clinical experience and knowledge, the x-ray, electrocardiograph and other diagnostic facilities have fostered a greater acumen in exact diagnosis. The clinician presently views askance the categories of "senility," Bright's disease in later life and "dropsy" and endeavors to effect a more exact terminologic classification. Cohn and Lingg indicate that when these diagnostic "catch-alls" are included with those of chronic heart disease the increase in cardiac deaths is not nearly so real and the levels of evidence flatten out. A more general scheme in the nomenclature of statistical diagnosis and less of arbitrary diagnosis does not reveal a marked increase. The statistics from the states added to the registration area since 1900 are at variance in many points from those in the original area, which may lead to false speculation. For accurate comparison the data should be studied with due consideration for geographical location and varying advancement in medical knowledge. Bolduan's study would bear out these implications.

All things considered, however, there is yet an apparent increase in deaths from heart disease as is true of other diseases in the declining years of life, *e.g.*, cancer and diabetes. The influences bringing this about are probably benign, however—not malignant.

REFERENCES

1. Cohn, A. E., and Lingg, C.: *Am. Heart Jour.*, 9:283.
2. Dublin, L. I.: *Favorable aspects of heart disease.* Metrop. Life Ins. Co. Press.

OBITUARY

Dr. Nils Andreas Biorn

The sudden death of Dr. N. A. Biorn at his home in Jackson, Minnesota, Sunday evening, February 4, 1934, came as a shock to his family and many friends.

Dr. Biorn was born at Manitowoc, Wisconsin, March 6, 1874, the son of Reverend L. M. Biorn and Borli Fleischer Biorn. He accompanied his parents, at an early age, to Zumbrota, Minnesota, where his father served as pastor for twenty-eight years, and where he attended school. After a year at St. Olaf Academy he attended the University of Minnesota and Hamline University Medical School, from which he graduated in 1901.

Dr. Biorn began practice at Gary, Minnesota, and later moved to Ada. On July 18, 1906, he married Julia Aune of Fergus Falls and in 1913 moved to Hatton, North Dakota, and then to Jackson, Minnesota, in April, 1914.

Dr. Biorn was a gentleman of quiet manner but possessed a droll good nature which made him popular in any company. Possessed of a rich bass voice he was always liberal in contributing to the success of any musical program of church, social or civic nature. He was also a lover of the great outdoors and was never happier than when he was on the golf course, where his skill brought him the local golf championship.

Dr. Biorn is survived by his widow and four children—the Reverend Boral Biorn of Minneapolis, Mrs. Carl M. Gulbrandson of St. Cloud, Carl, a student at the University of Minnesota, and Mildred. He is also survived by two brothers, Carl Herman Biorn of Saint Paul and Rognas Biorn of Minot, North Dakota, and a sister, Mrs. C. A. Mellby of Northfield, Minnesota.

*This article has been submitted by the Heart Committee of the Minnesota State Medical Association. At the suggestion of the Council of the Association, articles will appear from time to time under the heading of the various Committees of the Association.

Dr. Angell S. Hoiland
1884-1934

Dr. Angell S. Hoiland, Minneapolis eye, ear, nose and throat specialist, died February 22, 1934, in Deaconess Hospital after a long illness. He was forty-nine years old.

Dr. Hoiland was born in Benson, Minn., April 19, 1884, and was educated in the public schools of Benson. He was graduated from the medical school at the University of Minnesota in 1910. After twelve years of practicing medicine and surgery in Argyle, Minn., Dr. Hoiland took postgraduate work in ophthalmology and otolaryngology in New York and began the practice of that specialty in Minneapolis in 1923.

Dr. Hoiland was a member of the staff of the eye, ear, nose and throat department at General Hospital from 1923 to 1930. He was a member of the county, state and American Medical Associations and was a fellow of the American College of Surgeons and the Minnesota Academy of Ophthalmology and Otolaryngology. He also was a member of the staff at Deaconess Hospital and Ebenezer home and was a member of Alpha Kappa, Theta Chi and Selim Grotto.

Dr. Hoiland was active in the work of Central Lutheran church. He was deacon there from 1923 to 1925 and again in 1930. He was a trustee from 1927 to 1929 and was vice president in 1933.

He was married to Clara C. Overby in June, 1922. He is survived by his wife: three children, Claire Louise, Ann Josephine and Andrew John; his mother, Mrs. A. J. Hoiland; two sisters, Mrs. William G. McAllister and Minda Hoiland, and two brothers, Julius and Theodore. His mother and brothers and sisters reside in Benson.

Dr. Thomas E. McDermott
1857-1934

Dr. Thomas E. McDermott died Tuesday, February 20, 1934, in St. Barnabas Hospital after an illness of two months. He was seventy-seven years old.

Dr. McDermott, a graduate of the Chicago Medical School, was born at Fennimore, Wis., and practiced medicine there until coming to Minneapolis in 1903. He continued his medical practice in Minneapolis until his retirement three years ago. He had been in ill health since that time.

Dr. McDermott was a member of the Hennepin County and Minnesota Medical Associations. Surviving are his wife; a son, Mills McDermott, Encinita, Calif.; one daughter, Mrs. George Carruthers, Jr., of Winnipeg; and two sisters, Mrs. Emma Bower of California and Mrs. Melvin Shearer, Edgerton, Wis.

Dr. Brewer Mattocks

Dr. Brewer Mattocks, the last of the group that founded our State Medical Association and the Ramsey County Medical Society, died in his ninety-third year on February 25, 1934, at the Soldiers Home in Minneapolis. He was born in Tuesdale, N. Y., September 9, 1841, and came to Saint Paul with his father, the Rev. John Mattocks, in 1856. He attended the Philadelphia College of Pharmacy and after his course there returned to Saint Paul. At the outbreak of the Civil War he enlisted as Hospital Steward in the Second Minnesota Volunteer Infantry and later became Assistant Surgeon in the Seventh Regiment. While in the army he was stationed in one of the army hospitals in Saint Louis and had the opportunity of attending the Saint Louis Medical College, from which he received his degree in 1864. After his discharge from the Army he began the practice of Medicine in Saint Paul. He was City Physician and Health Officer from 1867 to 1871 and again from 1874 to 1880 and County Phy-

sician from 1874 to 1882. At the end of his term of service as County Physician he moved to Faribault, where he practiced Medicine till he retired in the year 1900. In 1871 he published a small book, "Minnesota, a Home for Invalids"; J. B. Lippincott, Philadelphia. This was the first medical book published by a physician resident in Minnesota. He also wrote a book of poems and a novel. During his last years he resided at the Minnesota Soldiers Home. He is survived by a son of the same name, a resident of Duluth.

J. M. A.

Dr. Charles G. Weston
1858-1934

Dr. Charles Galen Weston, former Minneapolis city physician, died Friday, March 2, 1934, at Miami, Fla. His home had been at Winter Park, Fla., since 1925.

Dr. Weston was born in Chelsea, Mass., April 25, 1858. He graduated from Harvard Medical School in 1882, later taking special work at the Boston Lying-In Hospital and the Massachusetts General Hospital. He came to Minneapolis in 1888. He was assistant city physician from 1891 to 1893, and city physician from 1893 to 1899. His efforts were an important factor in the building of the Minneapolis General Hospital where he instituted a nurses' training school.

Dr. Weston was president of the Hennepin County Medical Society from 1894 to 1895 and also a member of the American College of Surgeons and the American Medical Association. In 1910 he helped organize Hill Crest Hospital and was an active member of the Hill Crest staff until 1925, when he retired and moved to Florida.

Survivors are the widow, Ella C., of Winter Park, Fla.; two daughters, Mrs. Leroy W. Hall of Minneapolis and Mrs. Harry E. Tuttle of Miami, Fla.; two sons, Carlyle D. of Winter Park and Scot Derby Weston of Minneapolis; one brother, F. Irving Weston of Medford, Mass.; two sisters, Miss Gertrude Weston, of St. Petersburg, Fla., and Miss Florence Weston of Minneapolis; and seven grandchildren.

CORRESPONDENCE

Saint Paul, Minn.,
March 9, 1934.

To the Editor:

At a meeting of the members of the Executive Committee of the Ramsey County Medical Society on March 5, the editorial on page 150 of the March issue of MINNESOTA MEDICINE under the caption "Twin City Sewage Disposal Plant" came up for discussion. In view of the fact that the editorial seems to have given rise to a misunderstanding in the minds of some of the readers, the Secretary was instructed to communicate with you.

The only interest which the members and officers of the Hennepin County Medical Society and the Ramsey County Medical Society had in this project was to put forth all possible effort to see that the employees injured on this work might have the choice of their own family physician and hospital if needed.

Of course, it is difficult to state what may have been the original plans and intentions, but the situation at the present time as we understand it is about as follows: There will be stationed at the works a physician who is to render first aid only and "First aid" has been defined as that professional service rendered at the works only. In addition to this, there will be a chief surgeon whose duty it will be to have general supervision of the injured person, but not in any way to enter into or dictate his professional care. After first aid has been rendered, the patient is to have his choice of

physician if he needs further care, and his choice of hospital if he requires hospitalization. In case the patient, because of his injury or because of his lack of decision, does not designate anybody as his choice or has no hospital preference, arrangements are to be made where these men may be sent to physicians in rotation. It has been stated that the local federal P. W. A. engineer is opposed to the plan of covering this employers' risk with one insurance policy, but so far as we are able to learn, he has never expressed an objection to the medical scheme outlined above. However, many changes may still be made.

In order that the federal government and the state may be protected against exorbitant fees on the part of these so-called family physicians, it has been suggested and informally endorsed by the medical societies mentioned above that they would appoint a committee or committees to go over the bills and reduce those that bear the suggestion of overcharge.

These specifications were presented in legal form by Attorney Brist and presented to the members of the Sewage Commission on or about January 20, and were accepted by them. To the best of our knowledge, this is the present status of this matter.

Yours truly,
A. G. SCHULZE, *Secretary*
RAMSEY COUNTY MEDICAL SOCIETY

EDITOR'S NOTE: The editorial referred to advocated the principle of free choice of physician in the operation of industrial insurance in connection with the construction of the Twin City Sewage Disposal Plant. It also called attention to the fact that in the past unwarranted pressure had been brought to bear by the insurance companies on individuals coming under industrial insurance to force them to accept the services of specified surgeons.

With a construction project involving a payroll of \$2,000,000 a year and a medical compensation insurance rate of \$18.00 per \$100 of payroll (\$360,000) the importance of proper regulation of the handling of medical cases is accentuated.

It should be a source of satisfaction to the medical profession at large to know that PWA regulations require that all projects financed in whole or in part by federal funds shall be covered by workmen's compensation insurance policies. This has been brought out in connection with the construction project referred to and has been definitely decided.

In view of the manner in which compensation cases have been diverted away from their own physicians in the past, it behooves the medical profession to take the necessary steps to see that those injured in connection with the construction project under consideration actually have free choice of their physicians.

The suggestion in the above communication that the Hennepin and Ramsey County Medical Societies establish committees to have jurisdiction over compensation cases seems a good one. That the insurance companies or commission may wish to employ a surgeon to follow the course and treatment of these patients seems reasonable. The practicability of employing a surgeon to render first aid in this sort of job rests with the insurance company, but the treatment rendered by such an employed surgeon should be limited to the dispensing of first aid.

UNLICENSED BONE-SETTERS WARNED TO STOP PRACTICING

The Minnesota State Board of Medical Examiners has issued a warning to three unlicensed practitioners of healing, so-called "bone-setters," that they are to cease their activities unless they are registered under the Basic Science Law and licensed to practice.

These men and the towns where they have been practicing are:

P. D. Heppner, Butterfield, Minnesota;
Claus Hiebert, Bingham Lake, Minnesota;
Jacob Goertzen, Mountain Lake, Minnesota.

These persons are not licensed to practice under the Basic Science Law nor the Medical Practice Act and they will not be permitted to treat people in the future, in violation of the laws of the State of Minnesota. The Medical Board respectfully requests that any case of treatment subsequent to March 17, 1934, by any of these persons be promptly reported to the Board at 524 Lowry Medical Arts Bldg., St. Paul, and action will be taken to force a compliance with the laws of the state.

E. J. ENGBERG, *Secretary*.

OF GENERAL INTEREST

Dr. John R. Meade has opened an office for the practice of general medicine at 741 Lowry Medical Arts Building, Saint Paul.

Dr. Martin Nordland was elected president of the Minneapolis Surgical Society at the regular meeting held March 1, 1934. Dr. James Johnson was elected vice president and Dr. Richard Cranmer was elected to the Council.

Dr. E. M. Hammes has been appointed by the Council to fill the vacancy on the Editing and Publishing Committee of MINNESOTA MEDICINE created by the resignation of Dr. John M. Armstrong. In accepting Dr. Armstrong's resignation the Council expressed its appreciation of the ten years' of efficient service rendered the journal by Dr. Armstrong.

Dr. Walter L. Bierring of Des Moines, Iowa, president-elect of the American Medical Association, gave the first address of the annual Clarence Martin Jackson lectureship at the University of Minnesota, February 27, 1934. The lectureship was established last year by the alumni of the Minnesota chapter of Phi Beta Pi medical fraternity in honor of Dr. C. M. Jackson, head of the anatomy department of the University Medical School.

Dr. Bierring gave a most interesting summary of the outstanding achievements in medical science, the title of his paper being "The Historical Sequence of Medical Events."

The Olmsted-Houston-Fillmore-Dodge County Medical Society desires to congratulate Dr. W. A. Allen of Rochester, Minnesota, on attaining the age of one hundred years, on his persistent interest in active practice, on maintaining an exceptional breadth of vision and liberality of mind, and on his loyalty to the medical profession, to this Society, and to the Minnesota State Medical Association. The Society appreciates the fact that he has been a member of the Minnesota State Medical Association since its organization, that he has remitted his dues regularly without claiming the privilege of affiliate membership, and that he has used his influence in the support of ethical medicine and the public interest in medical affairs.

It is resolved that these sentiments be incorporated in the minutes of the Society and that a copy be sent to MINNESOTA MEDICINE and to Dr. Allen.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

LICENSED CHIROPRACTOR-MAASSEUSE PLEADS GUILTY DURING TRIAL TO PRACTISING MEDICINE WITHOUT A LICENSE
State of Minnesota *vs.* Christine Nelson

Mrs. Christine Nelson, fifty-nine years of age, 2805 East 24th Street, Minneapolis, entered a plea of guilty to an indictment charging her with practicing medicine without a license, before the Honorable Arthur W. Selover, Judge of the District Court, on February 26, 1934. Judge Selover sentenced the defendant to pay a fine of \$250.00 or six months in the Minneapolis Workhouse. The sentence was stayed for one year upon the condition that the defendant absolutely refrain from the practice of medicine.

Mrs. Nelson, over a period of two years and a half, had been treating a middle aged Minneapolis woman for cancer of the breast. During this time Mrs. Nelson had been paid the sum of \$310.00. The treatment consisted of the application of a salve or paste followed by the application of a flax-seed poultice causing a sloughing of the involved area. The patient's condition became worse and it was necessary to call in a physician and surgeon, who operated upon the patient and removed the breast in November, 1933.

Mrs. Nelson has been putting out professional cards reading as follows:

Graduate Prof. Yuell's
Swedish Massage System
Dial Du. 1589
MRS. C. J. NELSON
CANCER SPECIALIST
AT YOUR OWN RISK
Office: 2805 East 24th Street
Minneapolis, Minn.
Hours 1 to 5 P. M.
Sunday by Appointment

If there is any further violation of the law by the defendant the State Board of Medical Examiners will request that more drastic action be taken against Mrs. Nelson.

OLMSTED COUNTY QUACK LASTS ONLY THREE WEEKS

State of Minnesota *vs.* Stanley C. Flanning

On March 20, 1934, Stanley C. Flanning, fifty-seven years of age, entered a plea of guilty to practicing healing without a Basic Science Certificate at Rochester, Minnesota, before the Hon. Vernon Gates, Judge of the District Court. Judge Gates imposed a sentence of five months in the Olmsted County Jail, which sentence was suspended, and the defendant placed on probation conditioned upon his absolutely refraining from practicing healing in any manner in the future. This sentence should be quite effective in preventing the defendant from practicing in the future.

Flanning, who came to Rochester from Waterloo, Iowa, formerly was in the real estate business. He has had no medical training whatsoever and for about three weeks prior to his arrest on March 19, he had been treating at least two patients for diabetes in his room at a Rochester Hotel. His treatment consisted of injections of insulin with a hypodermic needle.

He also made examinations of the urine. Following an investigation by the Minnesota State Board of Medical Examiners Flanning was arrested charged with practicing healing without a Basic Science Certificate. He stated to the Court that he had only treated these two patients and that he had been in the "business" less than three weeks.

The Minnesota State Board of Medical Examiners wishes to acknowledge the splendid coöperation of Mr. Hayes Dansingburg, County Attorney of Olmsted County, and the coöperation of the Rochester Police Department and particularly Mr. E. J. Dison, plain clothes man. The hotel at which the defendant stayed also coöperated in bringing to light the activities of the defendant. The Minnesota State Board of Medical Examiners also believe that the sentence imposed by Judge Gates will materially assist the defendant in keeping out of the practice of healing.

E. J. ENGBERG, Secretary.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MEDICAL BROADCAST FOR THE MONTH
The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 10:15 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of April will be as follows:

April 4—Congenital Heart Disease.

April 11—Diphtheria.

April 18—Health Value of Play.

April 25—The Cancer Problem.

AMERICAN COLLEGE OF PHYSICIANS

The eighteenth annual clinical session of the American College of Physicians will be held in Chicago April 16 to 20, with general headquarters at the Palmer House.

Afternoons and evenings will be devoted to addresses and the mornings to clinics and demonstrations by local members and invited guests.

Those entitled to attend are members of the College, members of the Chicago Medical Society and medical students in the local medical schools. Qualified physicians may attend the session as visitors upon payment of a fee of \$12.00, which includes one year's subscription to the *Annals of Internal Medicine*, in which the proceedings will be published.

STATE MEETING

Scientific exhibits will play a very important part in the program of the 81st annual meeting of the Minnesota State Medical Association to be held in Duluth at the Duluth Hotel, July 16, 17 and 18, 1934.

Demonstrations and lectures will be combined with the continuous exhibits to an unprecedented extent.

Among them will be a heart exhibit to be accompanied by demonstrations in diagnosis. Sharing the same exhibit room will be a demonstration of the injection treatment for varicose veins.

An extensive exhibit on diabetes is planned in the course of which there will be periodic lectures on diets and treatment. Specimen diets will be shown.

A famous exhibit on pneumonitis that has been shown all over the United States will also be on display at the Duluth meeting. It was prepared by John W. Towey of Powers, Michigan. Doctor Towey will be present himself to read a paper before one of the medical sections of the meeting.

Two exhibits now being prepared for display at the meeting of the American Medical Association to be held in Cleveland, June 11 to 15, will be sent intact to the meeting. One, on dermatitis and cosmetics, is being prepared under the direction of A. J. Cramp, director of the Bureau of Investigation. The other is the United States Public Health Service exhibit on encephalitis, based on investigations and figures accumulated as a result of the St. Louis epidemic.

Tularemia, which continues to be an increasing problem in Minnesota, will be the subject of an exhibit by R. G. Green, of the State Board of Health.

According to present plans, which the Committee on Scientific Assembly announces are nearly complete, Monday sessions will be in the hands of the special societies. There will be a joint evening program with the Women's Auxiliary, which will hold its annual meeting

at the same time, Monday night, with entertainment to follow.

Among the events of Tuesday and Wednesday are the series of dry clinics scheduled for both mornings, a symposium on endocrine glands, a number of important lectures by out-of-state speakers and the scientific cinema.

The annual banquet will be held Tuesday night.

MINNEAPOLIS SURGICAL SOCIETY

ANNUAL SYMPOSIUM ON CANCER

Devoted to the Occurrence of Cancer in Private Practice and the Available Means of Treatment
Hennepin County Medical Society Auditorium
April 5, 1934—8:00 P. M.

1. Dr. Kenneth Bulkley, President:
 1. Announcements and Introduction of Cancer Committee Chairman.
2. Dr. J. Frank Corbett, Chairman:
 1. Introductory Remarks.
 2. Personnel of Committee.
 3. Scope of Work Undertaken.
3. Dr. Ivar Sivertsen, Chairman of Sub-Committee:
 1. Report of Survey of the Incidence of Cancer in Minneapolis.
 2. A Detailed Report of Cases Treated in Private Practice.
4. Dr. A. A. Zierold, Chairman of Sub-Committee:
 1. Report on X-ray Therapy as an Adjunct to Surgery.
 2. Survey of Facilities for Deep X-ray Therapy in Minneapolis.

By invitation the following will collaborate on the various phases of x-ray therapy:

- (a) Dr. Russell Morse, St. Barnabas Hospital.
- (b) Dr. W. H. Ude, Eitel Hospital.
- (c) Dr. C. T. Nordin, Swedish Hospital.
- (d) Dr. R. G. Allison, Northwestern Hospital.

5. Dr. Martin Nordland, Chairman of Sub-Committee:
 1. Report on the Use of Radium as an Adjunct to Surgery.
 2. Survey of Facilities for Radium Therapy in Minneapolis.

The following will collaborate on the scope of radium therapy:

- (a) Dr. Wm. T. Peyton: The Use of Radium in Malignancy of the Oral Cavity.
- (b) Dr. L. M. Larson: The Use of Radium in the Treatment of Cancer of the Rectum.
- (c) Dr. Charles R. Drake (by invitation): The Use of Radium in Uterine Malignancy.
- (d) Dr. A. S. Fleming (by invitation): Dangers in the Use of Radium.

6. Open Forum Report of Five-year Cases by all Members of the Society.

Only patients free from signs or symptoms five years after removal of malignancy are to be included. These reports will cover all organs of the body.

MINNESOTA RADIOLOGICAL SOCIETY

The Minnesota Radiological Society held its winter meeting at the University Hospital, Minneapolis, Minnesota, on March 10, 1934. The following program was presented:

1. Roentgenologic Studies of Multiple Births—LEO G. RIGLER, M.D.
2. The Incidence of Para-esophageal Hernia in Pregnant Women—JOHN B. ENEBOE, M.D.
Discussed by WALTER H. UDE, M.D.
3. Radiation Effects on Tissue Cultures of Lymph

Nodes—JOSEPH T. KING, M.D., and K. W. STENSTROM, Ph.D.

4. The Ventriculogram in a Case of Tuberculosis—N. J. BERKWITZ, M.D., and LEO G. RIGLER, M.D.
5. Benign Strictures of the Stomach—JACOB SAGEL, M.D.
6. Observations on the Radiation Therapy of Carcinoma of the Breast—K. W. STENSTROM, Ph.D.
Discussed by E. T. LEDDY, M.D.
7. Histologic Studies of Human Liver After Injection of Thorium Dioxide Sol—LEO G. RIGLER, M.D., and RUDOLPH KOUCKY, M.D.
8. The Epiphysis of the Tuberosity of the Fifth Metatarsal—JOHN B. ENEBOE, M.D.
Discussed by JOHN D. CAMP, M.D.
9. Roentgen Observations on Acute Amebic Colitis—KANO IKEDA, M.D.
10. Roentgen Observations on Early Tuberculosis in Young Adults—LEO G. RIGLER, M.D.
Discussed by M. B. HANSON, M.D.
11. Case Reports:
 - a. Spontaneous Gastro-enterostomy—C. N. BORMAN, M.D.
 - b. Lympho-epithelioma—C. O. HANSEN, M.D.
 - c. Trichobezoar—OSCAR LIPSCHULTZ, M.D.
 - d. Osteomyelitis of the Patella—JACOB SAGEL, M.D.
 - e. Gall Bladder Obstruction of the Small Intestine—C. N. BORMAN, M.D.

ADDRESSES

The American Board of Radiology

B. R. KIRKLIN, M.D.

Observations on the Diagnosis and Treatment of Malignancy

WILLIAM T. PEYTON, M.D.

The Minnesota Radiological Society wishes to announce the establishment of an annual lectureship in Radiology in honor of Dr. Russell D. Carman. This is to be known as the Russell D. Carman Memorial Lecture, and will consist of an address by a prominent radiologist at the annual meeting of the Minnesota State Medical Association before the general assembly of that body.

The first in this series of lectures will be given by Dr. A. B. Moore of Washington, D. C., at the meeting of the Minnesota State Medical Association in Duluth, Minnesota, July 16, 1934. In addition, at this meeting, Dr. Donald C. Balfour of Rochester, Minnesota, will deliver an address on the life of Dr. Russell D. Carman.

LEO G. RIGLER, *Secretary*.

DINNER AND PROGRAM AT BUENA VISTA SANATORIUM

The annual get-together meeting of the Wabasha and Winona County Medical Societies at the Sanatorium, Wabasha, was held Monday evening, March 19, 1934.

There were twenty-six physicians in attendance. Speakers on medical welfare topics were: Dr. F. J. Savage, president of the State Medical Association; Dr. H. Z. Giffin, Councilor from this district, and the secretaries of the two county societies.

The scientific program included the following presentations:

"The Cancer Problem in Minnesota"—Dr. F. J. Savage, Saint Paul.

"The Acute Abdomen"—Dr. F. J. Plondke, Saint Paul.

"Intracapsular Fracture of the Hip"—Dr. C. C. Chatterton, Saint Paul.

"The Present Status of Serum Treatment in Pneumonia"—Dr. H. J. Moersch, Rochester

"Résumé of the 1933 Campaign against Tuberculosis and from the Sanatorium"—Dr. Russell H. Frost, Supt., Wabasha.

Dr. R. C. Radabaugh of Hastings, president of the Wabasha County society, acted as master of ceremonies.

W. F. WILSON, *Secretary*
Wabasha County Society.

TRANSACTIONS *of the* MINNEAPOLIS SURGICAL SOCIETY

STATED MEETING HELD JANUARY 4, 1934

The President, DR. KENNETH BULKLEY, in the Chair

TREATMENT OF PROLAPSE OF THE RECTUM
AND INTUSSUSCEPTION OF THE PELVIC
COLON BY STRANGULATING THE PRO-
LAPSED GUT WITH A RUBBER
BAND

OWEN WANGENSTEEN, M.D.

Several years ago, it was my privilege to spend a "Wanderjahr" abroad. It was my good fortune to meet Lord Moynihan, then Sir Berkeley, through the courtesy of Dr. William J. Mayo. In his usual magnanimous and gracious manner, Dr. Mayo must have been exceedingly complimentary, for Sir Berkeley was very kind to me. A few days after I made his acquaintance, I had the pleasure of hearing him give a masterly address on cancer of the stomach before the International Cancer Conference then convening in London. The afternoon of the same day, while rummaging about amongst the stacks of specimens in the pathological museum of the Royal College of Surgeons, I met Sir Berkeley. Fortunately for me, he recognized me and I had the opportunity to tell him how much pleasure I had experienced in hearing his lecture. It confirmed the impression gained from many sources, I stated, that he was the greatest orator amongst English speaking medical men. Sir Berkeley put his hands on my shoulders in a friendly and paternal way and said in his inimitable manner, "My boy, if there is any advice that I might give you which is more worth while than anything else I might say, it is this: study the art of expression and learn to dress old thoughts anew; I should recommend to you Shakespear's sonnets, and particularly sonnet number seventy-six." That very day I procured a copy of these sonnets and looked anxiously to see what Sir Berkeley had meant. The closing quatrain of this sonnet runs as follows:

"So all my best is dressing old words new,
Spending again what is already spent:
For as the sun is daily new and old,
So is my love still telling what is told."

The paper that I am presenting tonight is essentially the retelling of an old story. The manner of dealing with prolapse of the rectum, as I am describing to you here, first came to my attention in an article upon the subject by Dr. Mont Reid, Professor of Surgery at the University of Cincinnati. In the May issue of the *American Journal of Surgery* for 1933, Reid states that he first employed the method in Peking in 1925 on a Chinese girl who presented herself with an incarcerated and strangulated rectal prolapse. He had since used the method in a few additional cases, he states, with complete satisfaction.

Reid places two ordinary strong rubber bands at the base of the prolapsed gut, which is in consequence strangulated and gradually sloughs away from the healthy tissues. An effectual obliteration of the peritoneal cavity which extends down usually to the apex of the intussusception is obtained by these bands. It is necessary, however, to be certain that no loops of gut are contained in this extension of the peritoneal cavity.

The history of the patient in which I employed the method described by Dr. Reid is as follows:

Mrs. M. P., Hospital No. 319326. Age 47. This patient was admitted to the University Hospital on November 10, 1933, for the treatment of rectal prolapse

which had been present for sixteen years. She had had a large number of pregnancies, many of which had not gone to term. She had given birth to eight children. Twenty-two years ago the gallbladder was drained; on a recent previous admission it was removed at the University Hospital. For sixteen years the patient has had incontinence of feces caused by the rectal prolapse. The patient has always been able to return the prolapsed gut. When the gut has been prolapsed the patient had not been able to void and she found it necessary to return the prolapsed gut before being able to empty the bladder. The patient has previously had a hysterectomy and also a vaginal floor repair. Examination shows a well developed woman with several scars on her abdomen. There is a marked protrusion of the rectum when the patient stands, and when I first examined her, feces covered the inner aspects of the thighs and the entire perineum. The entire thickness of the gut wall was prolapsed; it was about six inches in length, making an over-all length of about 10 or 12 inches. The prolapse could be easily reduced. The external sphincter was dilated to permit of the extrusion of this large segment of gut. When the prolapse was reduced the gloved fist could be easily inserted into the rectum. A moderate rectocele was present, namely, a bulging of the anterior rectal wall into the vagina when the patient strained, and a second degree cystocele was also present. The cervix was small and the uterus was absent. The remainder of the physical examination was essentially negative. The patient had a systolic blood pressure of 158 mm. Hg.; the diastolic was 90. The urine examination was essentially negative save for the occasional presence of white blood cells. Hemoglobin was 91; white blood cells 11,950; normal differential.

A number of operative procedures had been suggested for the correction of her defect. In consultation, the gynecologists had suggested tightening of the external sphincter of the rectum together with repair of the pelvic floor, particularly drawing the levator ani muscles together high up in the vaginal vault. The Moschowitz operation of obliterating the cul-de-sac had also been contemplated as well as the Mikulicz operation of amputating the prolapsed gut.

Operation November 16, 1933, under spinal anesthesia, employing 75 milligrams of novocaine crystals. The gut was pulled down as far as it would come. The patient was placed in steep Trendelenburg posture and careful palpation was made through the posterior wall of the vagina to be certain that no loop of gut came into the extension of the peritoneal cavity which went down well into the bottom of this herniation. The length of the gut prolapsed was such that it might be described as a prolapse of the rectum plus intussusception of some of the pelvic colon. A large stiff rubber tube with an internal diameter of about $\frac{3}{4}$ inch was pushed up through the prolapsed gut. At the very apex of the intussusception, a few sutures were put through the mucosa anchoring the tube to the gut wall. Two fairly stiff rubber bands were then placed about the prolapsed gut at the base, in juxtaposition to the external sphincter. The patient complained of slight pain over the lower abdomen as these bands were placed in situ, probably occasioned by squeezing of the mesentery to the segment of gut concerned.

The postoperative course was uneventful. Gas bacillus antitoxin was given immediately after operation to guard against gas gangrene. After the spinal anesthesia wore off, the patient complained of steady pain in

her abdomen. There were no intestinal cramps, however, as one might expect were a loop of small intestine obstructed. Auscultation of the abdomen revealed numerous noises that could be intermittently heard. There being no pain at the acme of these noises, however, it was clear that intestinal colic was not present. An occasional x-ray film was taken to rule out the presence of intestinal distention. At no time did gaseous distention of any coils of the small intestine or colon occur. The patient had a low grade fever of 1 degree for about three or four days immediately after operation, and then it was normal until about the twelfth day, when there was again slight fever of about two days' duration. The gangrenous gut was daily inspected. The reddish hue of the prolapsed gut quickly turned to a cyanosed color after the application of the bands. A short time later it was anemic in appearance, indicating, too, that the arterial blood flow to the gut had been arrested. The gut continued to be a lustreless grayish color for several days. There was at first some odor, which gradually cleared up and the gut became drier and shrank in size; the strangulated gut gradually became dark, first at the apex, which color slowly extended to the site of the application of the band. Two weeks and a day following the application of the band the tube with the strangulated gut came away of itself. It was interesting that, of the internal cylinder, a length of gut about an inch longer than the gut strangulated also came away, indicating that probably the blood supply of a portion of the proximal gut had been compromised. This undoubtedly is dependent upon the blood supply of the gut wall and the arrangement of the blood vessels.

The dilated external sphincter had in the meantime contracted, but when the gut came away the external sphincter was still relaxed but had come down to somewhat near the normal diameter. The patient appeared to have complete incontinence at first but as time went on it improved considerably, such that when she left the hospital on December 5, three or four days after the tube came away, the patient did have fair continence for feces but not for gas. The patient was maintained on a low residue diet during her stay in the hospital and the bowels moved now and then through the large rectal tube. Digital examination of the rectum made on dismissal showed a shallow excavation about an inch proximal to the external margin of the anal canal which went circularly around the rectum. This depression was rather shallow, but probably represented the site of amputation of the internal cylinder of the gut by rubber bands. The smooth margin beyond this depression undoubtedly is the mucosa of the lowermost portion of the pelvic colon. The patient returned to the hospital a few days later stating that continence was much better. Examination at this time indicated that the external sphincter had regained considerable tone, that it had contracted down a good deal from its previous state. The patient returned to her home and came on January 2, 1934, for re-examination, at which time the external sphincter had considerable tone. The patient had found that she could voluntarily contract the external sphincter fairly well, that she had fairly good continence for feces though continence for gas was not good. Examination of the rectum at this time demonstrated that the circular defect had filled in fairly well, but that there was retraction of the mucosa of the rectum proximal to the site of excavation. This mucosa was slightly stenosed, but not markedly so. Subsequent examinations will have to be made to note whether stricture formation is likely. In such an event occasional dilation will have to be done.*

The patient expresses herself as very well satisfied with the results.

My experience with the use of this method which Dr. Reid has described was so satisfactory that I endeavored to orient myself better as to the relative merits of the various types of operations performed for prolapse of the rectum and intussusception of the pelvic colon. Though most of you, I am certain, are familiar with the various methods employed in the treatment of rectal prolapse, it may be well, in order to evaluate the worth of this method, to consider briefly the factors which contribute to the development of prolapse as well as other therapeutic measures directed at its correction.

Cause of prolapse.—Prolapse of the rectum, on the whole, occurs largely in children, about seventy per cent of instances being observed in the first decade of life. The factors which contribute to its occurrence are difficult to evaluate accurately, but the following appear to be the more important: 1. Abnormal depth of the cul-de-sac. 2. Insufficiency of the pelvic floor. 3. Inadequacy of the suspensory supports of the rectum. 4. In infants, the presence of a relatively straight rectum and the absence of a well developed sacral concavity.

The anatomical studies of Waldeyer, Zuckerhandl and others emphasize the significance of the depth of the peritoneal cul-de-sac for the development of rectal prolapse. The unusual depth of Douglas' pouch precedes as well as attends the occurrence of prolapse. The levator ani muscle, the significant support in the pelvic floor, though it undoubtedly has some part in the occurrence of prolapse, is not of the same significance in its development as is separation of the levators in the occurrence of rectocele. Anyone who has done posterior excision of the rectum for malignancy knows that cutting the rectum free from the levators does not permit of its being pulled down very much. It is only when the visceral layer of the pelvic fascia, viz., the rectovesical fascia which surrounds the rectum and its lateral insertions, the pelvi-rectal bands, have been divided that the rectum can be easily mobilized. Verneuil likened the significance of the support lent the rectum by these fascial attachments to the chain which secured a prisoner in jail. When these supports give way, the rectum darts out through the anus.

All who have had the opportunity to ride in horse-drawn carriages are aware of the fact that a certain degree of rectal prolapse may be physiologic. From a pathological standpoint one may see sliding of the mucosa on the submucosa to prolapse of the entire gut wall. Though the length of the rectum may increase with prolapse, undoubtedly a number of cases have associated some degree of intussusception of the pelvic colon. In the higher grades of prolapse, the external sphincter is continuously dilated and fecal incontinence is the rule.

Therapy.—A large number of therapeutic aids have been directed toward treatment of rectal prolapse. The simpler of these are mechanical appliances of one sort or another intended to restrain the gut from coming down. Cauterization of the rectal mucous membrane is probably the oldest of the operative measures and is quite effectual where the mucosa, only, slides on the submucosa. The Gersuny twist is rarely done for rectal prolapse or incontinence today. Tightening of the dilated external sphincter by suture after the method of Kehrer (1880), the subcutaneous placement of a wire around the anal canal as advocated by Thiersch (1890), or a similar fascial sling have all been practised to retain the extended gut. Partial excision of the posterior portion of the external sphincter and rectal wall was done by Roberts (1890) to achieve the same end.

A number of plastic operations on the muscular supports of the rectum have been advised and are still frequently done. Obliteration of the deep cul-de-sac accompanying rectal prolapse has been advised to suspend the gut by a number of writers (Ludloff 1899, Moscho-

*The patient returned on February 19, 1934, for re-examination at the suggestion of Dr. Emil Haberman of Osakis, Minnesota, her physician. Dr. Haberman has employed a rectal dilator to unusually good advantage, for digital examination at this time shows quite a normal rectum. Continence for feces is perfect; continence for gas will undoubtedly be equally as good as soon as it is no longer necessary to pass the dilator through the external sphincter.

witz 1912, Rankin 1933), and appears to have met with considerable success. A number of internal types of fixation of the prolapsed gut have been advised, from the establishment of a temporary colostomy to suture of the mesentery of the pelvic colon to the anterior longitudinal ligament over the sacral promontory. Of the external rectopexies, the method of Ekehorn (1909) of Sweden has been most widely practised and in children appears to have given splendid results. A heavy unabsorbable suture is mounted on a curved cutting needle and passed from one side of the coccyx or lower sacrum into the rectal lumen and is brought out on the other side of the coccyx and tied. No serious infection apparently attends its use, judging from the reports of those having personal experience with the method. Gustaf Petren of Lund (1925) states that the method has been used twenty-five times in children in his clinic; there were no deaths; recurrence took place in about one-third of the cases, but all eventually exhibited good results.

Methods directed at achieving the same purpose are packing of the retrorectal space with gauze (Sick, 1909) and the injection of alcohol or paraffin into the rectal wall (Karewski, 1902). In this country the injection of alcohol into the rectal wall for prolapse in children has attained wide usage. In the Teutonic countries of Europe, the Ekehorn method has found wide acceptance for the same indication. In England, Lockhart Mummery has practiced and advised the Sick operation, which in consequence has enjoyed frequent employment.

A method more commonly used in France is the Delorme excision of mucosa from the prolapsed gut, the submucosa of the intussusception being reefed back and sutured to the perianal skin. These sutures plicate the denuded gut and fold it up into the anal canal like the leaves of an accordion. The operation is necessarily somewhat bloody but appears to be effectual.

The elastic ligature method of dealing with prolapse would appear to have been long employed. In 1883 Weinlecher described a method almost identical with that recently published by Reid. He first employed the method July 1, 1867.* In 1886 Weinlecher had done four cases. He inserted a stiff tube into the lumen of the prolapsed gut and strangulated it with an elastic rubber tube tied over the gut just distal to the anal margin.

In volume 33 of the *Wiener Medizinische Wochenschrift* for 1883 (pages 536 and 575) Dittel gives a description of a very similar method, which he had apparently employed in several cases and states that he first described its use in March, 1872 (in *Die Allgem. med. Zeitung* No. 7).

Many variants of this elastic ligature method of dealing with rectal prolapse have been described. In 1879 Kelberg (*Arch. f. klin. Chir.* vol. 24, p. 841) employed a like method, but cut the gut off and sutured the contiguous margins, and then removed the elastic ligature. He found a loop of small intestine in the extension of the cul-de-sac on opening the prolapsed gut. This operation has been widely performed and is usually known under the title of Mikulicz resection of the rectum for prolapse. In 1889 Mikulicz reported seven cases without mortality. Lenormant (1907) stated that the risk of peritonitis owing to opening of the peritoneal cavity is at least 10 per cent in this operation.

The rise of antiseptic surgery with the introduction of more aggressive methods undoubtedly contributed to the abandonment of the elastic ligature treatment of rectal prolapse and intussusception of the pelvic colon. Serafini reports its use with a good result in 1906. In 1912 Albert Bauer of Breslau from the clinic of the late Professor Küttner, in a very comprehensive paper on the treatment of prolapse, stated that the elastic ligature method had fallen into disuse, because of the oc-

currence of pain following the application of the ligature, the supervention of urinary retention and difficulty with the expulsion of gas. Dittel had enumerated in 1883 similar disadvantages attending its employment.

None of these, moreover, are of major concern. The deterrent that would arise in anyone's mind who elected to use the method would be whether the cul-de-sac contained any coils of small intestine. If any such loops of gut were present, they would of necessity have to insinuate themselves anterior to the rectum. In the female, at any rate, by simultaneous palpation through the vagina and the anal opening in a reducible prolapse, one may, I believe, determine with almost infallible accuracy whether the cul-de-sac is empty or not. In the male, however, this information cannot so readily be determined. A previous follow-through roentgen study of the small intestine with barium, as suggested by Reid, would help materially in eliminating any risk from this pitfall. A short suprapubic incision through which the hand could be inserted just prior to the application of the ligature would exclude all danger of simultaneously strangulating loops of small intestine.

It is not unlikely that this method may prove to be worth while also in certain instances of carcinoma of the pelvic colon near the site of reflexion of the parietal peritoneum, where one would be prompted to try an anterior resection of the gut to establish intestinal continuity.

Summary.—A case is reported in which prolapse of the rectum was treated by strangulating the prolapsed gut by rubber bands, a method recently described by Reid. This simple but effectual method apparently is an old one which has been in use for fifty or sixty years. In instances of incarcerated or strangulated prolapse, it should be the method of choice. In adults who may be treated by an elective method, this simple means should receive favorable consideration. Prolapse in children, on the whole, I believe, may be as efficiently treated by alcohol injection into the rectal wall or by the Ekehorn operation. In applying an elastic ligature over the prolapse, care should be observed that no coils of small intestine are in the cul-de-sac, which usually extends down to the apex of the intussusception.

DISCUSSION

DR. A. T. MANN: I think that this is an ideal presentation. The Society is to be congratulated on having subjects presented in this way. The subject itself is also an interesting one. The procedure expounded by Dr. Wangenstein is simple if it works; and it looks as though it would work nearly every time.

Of course, Dr. Wangenstein spoke of the dangers of some of the bowel coming down between the loops of the prolapsing rectum; and I think he covered that point fairly well. I think one can be pretty sure about not having something in down there. Of course, there is always the danger that if you put a clamp on over the cone with a loop of bowel in the space between the rectal folds you would establish an obstruction of the bowel in the loop which had been included, but you would know it quite soon. I do not know how bad the damage would be by the time you moved to get it out. I think, however, that is pretty "far fetched" in practice and believe you would be able to tell.

This cone is not an exaggeration at all. I have seen two cones larger than this. One cone projected five inches down and was correspondingly large in diameter. The other cone was a little smaller. I believe this procedure is excellent.

It occurred to me that most of the tissues in the rectum are not sensitive; and I wondered why Dr. Wangenstein employed any anesthesia at all. The operation might be done without any anesthesia, and it might be done in the country.

This method appeals to me very strongly. I operated

*Quoted by Mikulicz, *Arch. f. klin. Chir.*, 38:74, 1889.

on one of the professors at the University who had had one ever since he was a child, and he had one of these large cones. His sphincter had been stretched all these years. He came to see if I thought anything could be done. I felt I could do something. I did not know about this method but I did know about returning the bowel to the pelvis and obliterating the pelvic space, etc. I had seen Murphy of Chicago operate on one; and while he was operating it just occurred to me that if I were doing the operation I would raise up a flap of the tough fascia of the pelvic floor to help fasten the rectum up in the pelvis. That is what was done on this man; and I think I am original in that. That is an abdominal operation, denuding the base so there is something solid for the rectum to heal against and then cut a flap of that tough fascia of the pelvic floor and lay it open like the leaf of a book and then fasten the rectum into that space, then in turn fasten the flap very carefully to the rectum for a firm support.

Very recently I heard from this man, and the rectum has stayed perfectly in place. He has no trouble with his bowel movements, his sphincter has contracted, he is continent, and he must have had a stretched sphincter for between forty and fifty years.

Dr. Wangenstein spoke about two main dangers to be avoided: one, to be sure there is nothing between the folds of the prolapsed rectum, and I think anyone doing good surgery would know about that; and the other, the possible stricture. Of course, a stricture could be fairly easily taken care of if it should occur. One danger was not mentioned; it may not be a true one, but it is one which I thought of when this condition was first called to my attention, namely, further prolapse of the rectum; that is, the mesentery has been coming down all this time and it might come down further. That would simply mean a new operation of the same type of considerably lesser proportions. I think this is a very smooth procedure.

DR. LAWRENCE LARSON: What Dr. Wangenstein has stated concerning the clinical features of this type of operation for prolapse certainly holds true experimentally. In making colostomies in dogs I have found that if the openings became at all large, the mobility of the colon in dogs being so great, prolapse of 2 to 8 inches of bowel will readily take place. In these experiments prolapsed portions of intestine interfered so much that it was necessary to remedy the condition. Several methods of treatment were tried but none worked so well as the rubber band method which Dr. Wangenstein has described. To check upon the results of this type of treatment necropsy was done on several of these animals after complete healing of the bowel had taken place. There was no evidence of stricture formation or other complications in the cases examined. Therefore, experimentally at least, it would seem that this type of operation has much to recommend it in the treatment of the type of prolapse described.

DR. O. J. CAMPBELL: It just occurred to me that if there were any fear of bowel being incarcerated in the prolapsed rectum, x-ray after barium meal and barium enema would settle the question. If then the strangulating band were applied with the patient in an inverted position over a sharply angled operating table, the possibility of the bowel being damaged would be practically negligible.

DR. WANGENSTEEN: The patient for whom I employed this elastic ligature method left the hospital a few days after the strangulated gut came away. The dilated external sphincter had contracted a good deal, but she was far from continent. A few days later she returned, her face all wreathed in smiles. I knew she had good news.

Continence for feces was much better though she yet had no control over the escape of gas. In doing colostomies for malignancy, we, as surgeons, may be prone to overlook the full significance of the rectal sphincters. A man who presented himself at the University Hospital some years ago with a benign rectal

stricture is a case in point. A colostomy had been done for intestinal obstruction. Dr. Creevy and I excised the stricture of the rectum through a parasacral approach. When the posterior wound was healed the colostomy was closed. One morning shortly after the closure of the colostomy opening, this patient, not given to emotional outbursts, left his perch on the bedpan and appeared in the corridor of his ward shouting exultantly, "I have had a normal bowel movement." Only a sick man may fully appreciate that it is truly the lesser pleasures that afford real joy in life.

I suspect from the findings on digital examination of the rectum made yesterday when this patient, recently treated for prolapse, returned for examination at my request, that a stricture may develop. In the patients treated by Reid this complication did not occur. In my patient, when the strangulated gut came away, about an inch of the internal cylinder of the gut sloughed proximal to the site of application of the rubber bands. This occurrence, it appears, would be a variable one, depending upon the arrangement of the blood vessels to the lower pelvic colon or uppermost portion of the rectum. Its occasional occurrence, however, should not constitute a serious deterrent to the employment of the method, for it should be easily dilated.

It is not unlikely, however, that a portion of the internal sphincter of the rectum, which is essentially a continuation of the circular muscle coat of the gut, may be sacrificed in this operation. It is probable that this sphincter acts more in the manner of a detrusor emptying the rectum completely at the end of defecation than as a true sphincter of the anal canal (Cunningham).

My preference would be to employ a low spinal anesthesia with the patient in the steep Trendelenburg position. The application of the ligature simultaneously constricting bowel as well as its mesentery would, I believe, cause severe pain. It is not a method for office practice; the patient should be in a hospital. In males, as Dr. Campbell has pointed out, the absence of gut in the cul-de-sac would be more difficult of determination. If any doubt remained, one could readily prepare the lower abdomen and insert the gloved hand into the pelvis.

DR. E. C. ROBITSHEK: Is this form of treatment applicable, and to be recommended, in cases of prolapse of the rectum in children?

DR. WANGENSTEEN: On the whole, the results in children are so satisfactory with the employment of alcohol injection into the rectal wall or the Ekehorn operation that these methods, I believe, are to be preferred.

PHARYNGEAL DIVERTICULA

GILBERT COTTAM, M.D., F.A.C.S.

In 1764 Mr. Abraham Ludlow,⁶ Surgeon, at Bristol, reported the first case on record of pharyngeal diverticulum. This early report is noteworthy in that it gave a clear etiological history and at the postmortem examination the anatomical landmarks were accurately established (Fig. 1). Then followed the cases of Gianella (1782), Marx (1783), Thilow (1806), Monro (1811) and Sir Charles Bell (1816), all authenticated by autopsy.⁹ Bell's report² emphasized the pharyngeal origin. Kuehne of Berlin reported a case verified by autopsy in 1821 and then came the epochal research of Rokitsansky⁷ in 1837, when again the pharyngeal origin of these diverticula was noted and a close description of their pathological anatomy given. In 1876 Zenker of Erlangen made a systematic study of diverticulum formation in the pharynx and in the esophagus, based on twenty-seven cases in which autopsy was done, including those I have cited above. He⁸ divided them into *pressure diverticula* (pulsions-divertikel) and *traction diverticula*, in which latter "the wall is pulled out by something exercising traction from without." Of

the former (the pulsion type) he clearly states⁹ that they are of pharyngeal origin and that "in the literature such pharyngeal diverticula are repeatedly and erroneously described as esophageal."

Now comes a very important addition to this sequence. In 1908 Gustav Killian⁴ published the results of an anatomico-pathological study in which he established three important basic facts:

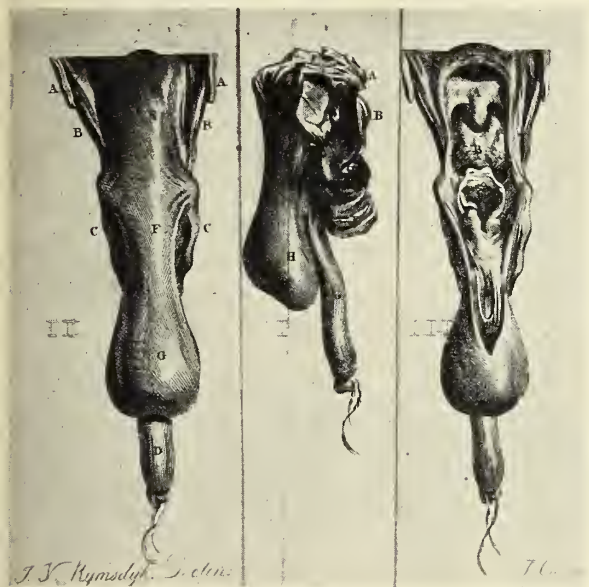


Fig. 1. Reproduction of the original copper-plate illustrations which accompanied Mr. Ludlow's article as published in 1767. Section I. The specimen exactly as removed from the body, H being the diverticulum, seen laterally. Sections II and III. Posterior views of the same, with normal structure added to show the anatomical relations.

1. The action of the cricopharyngeus as a sphincteric "mouth" to the esophagus (œsophagusmund or bouche de l'esophagus).

2. The weak spot between the cricopharyngeus and its companion muscle, the thyropharyngeus, constituting what has come to be known as "Killian's dehiscence" (Fig. 3).

3. The "lip" (levre) which forms the anterior wall of the diverticulum and distorts the opening into the esophagus (Fig. 4).

So much for the historical background, which is important for the reason that it furnishes the foundation for our present concepts. What in addition can we say to enable us to answer the question, what causes these things to form? First, let us quickly dispose of the possibility of embryonic origin. There are, it is true, such things as developmental diverticula but they are rare, small, symptomless and necessarily situated laterally or anteriorly. They are picked up as curiosities by the pathologist or in the course of routine x-ray examinations. The type we have under consideration constitutes the great majority of the cases furnishing clinical symptoms and is invariably found in the same place, behind the pos-

terior wall of the pharynx at the level of the cricoid cartilage, dipping down behind and to the left of the esophagus when they reach sufficient size.² These are what we have been calling diverticula of the esophagus or pharygeo-esophageal diverticula, either of which is a misnomer. They form because a hard bolus of food, or a foreign body (as in the cases of Ludlow, Dendy and Kuehne), is either retained by or gripped in the cricopharyngeus and the stress is imparted to the posterior wall, the site of Killian's dehiscence. This yields and the herniation begins. Of importance, I believe, is a factor which apparently has not been mentioned elsewhere, the unyielding cricoid cartilage, the back of which, shaped like the front of a signet ring, offers the one unyielding point to the passage of the bolus, so that when it is gripped or held at this point, the stress can only go backward to the weak point in the musculature. There are thus three stages in the formation of a pharyngeal diverticulum:

1. The initial separation of the muscle fibers at Killian's point (Fig. 2).

2. The stage of actual diverticulum formation, with a somewhat narrowed neck and globular sac formation (Figs. 3 and 6).

3. The spreading upward of the herniation (Fig. 4) so that the entire median raphe is ultimately stretched, as in the specimen I shall show (Fig. 5).

The innervation of the so-called constrictors of the pharynx must also be considered. They are all supplied by the pharyngeal plexus, but the cricopharyngeus portion of the lower constrictor also receives twigs from the recurrent laryngeal and it is worth considering that this may result in incoordination of the normal swallowing function when a sufficiently large bolus of food reaches this point.

Here, however, we quickly find ourselves in very deep water, for recently all our preconceived ideas on the precise nature of the function of deglutition have



Fig. 2.



Fig. 3.

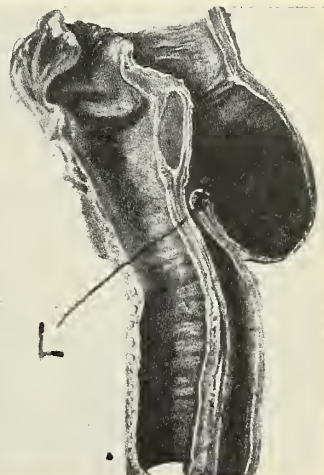


Fig. 4.

Fig. 2. Mr. F. G. Parsons' specimen from the museum of the Royal College of Surgeons, London, showing posterior view of beginning pharyngeal diverticulum.

Fig. 3. Killian's original drawing to show diverticulum protruding through space between thyro- and crico-pharyngeus, a more advanced stage than shown in Figure 2.

Fig. 4. Another specimen from the museum of the Royal College of Surgeons, London, showing a still more advanced stage. Note the wider neck and the beginning herniation of the upper posterior wall. Killian's lip shows plainly and is designated L.

been rudely upset by the observations of Hugo Laurell,³ confirming earlier but unrecognized researches by Schreiber⁸ and now supported by Barclay,¹ in which negative pressure within the pharynx and esophagus

is shown by x-ray study to be the propelling force rather than direct muscular action on the bolus. Barclay argues from this that we may have to drop Zenker's pulsion theory and advances the idea that all these acquired diverticula may in reality be of the traction type with extrinsic adhesions. Be that as it may, the negative pressure mechanism in the act of swallowing, apparently true, need not disturb our definitely gained knowledge of the anatomical aspects of the subject. Here the most important point we have gained is the

definite establishment of the constancy of occurrence of these symptom-producing diverticula at the junction of the two muscles comprising the inferior constrictor of the pharynx and this gives us, in operating, the valuable landmark of the cricoid cartilage, leading us directly to the neck of the diverticulum.

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DISCUSSION

DR. R. W. MORSE (by invitation): For some time we have been trying to demonstrate by means of roentgenograms the act of swallowing. More recently we have been checking over Barclay's theory that the rapidity of passage of any bolus of food through the pharynx is not due to muscular action, but that there has been created a vacuum which draws the bolus down into the esophagus. His contention is based on the fact that in the normal act of swallowing the passage of the bolus through the pharynx and into the esophagus is too rapid and smooth to be the result of muscle coordination. The passage through the pharynx is very rapid when the bolus is fluid or semisolid. When the bolus is fairly solid it passes rapidly, if it is well lubricated with saliva. The dry solid bolus passes slowly and irregularly and apparently is propelled by muscular contractions.

Figures 1, 2 and 3 illustrate the changes which can be observed roentgenographically during deglutition. Contrary to the common conception, the epiglottis does not fold back and protect the glottis. It remains upright in position. All of the air is displaced from the oral and laryngeal pharynx, and from that part of the larynx above the vocal cords. The structures beneath the base of the tongue are elevated. The cricoid and arytenoid cartilages together with the other structures of the larynx are elevated to the same degree as is the hyoid bone. The upper end of the esophagus is probably elevated along with the cricoid cartilage.

DR. MARTIN NORDLAND: I enjoyed Dr. Cottam's excellent presentation of this problem. I would like to call attention to a few points which he did not bring out in the treatment of this condition. It is true, as he stated, that the operation for a cure, in proper hands, is a simple one. Nevertheless, the possibilities of serious complications should be emphasized.

In the first place, because the sac lies in what is known as the "visceral space" behind the trachea, the danger of infection and a resulting mediastinitis is great. I believe it is conceded that the two-stage operation is the method of choice. In the first stage, the sac, which usually points downward, is pulled upward and fastened to the prethyroid or sternomastoid muscles. This permits the sac to empty completely and allows any inflammatory process to subside.

The second most important complication is the injury to the recurrent laryngeal nerve. This is particularly true in the removal of the larger sacs. The sac usually

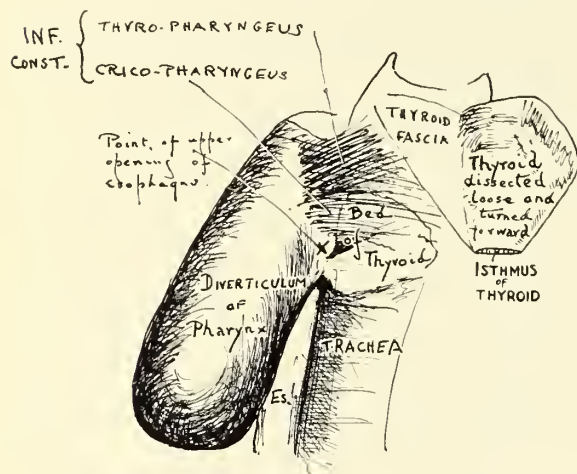


Fig. 5. Author's sketch (drawn to scale) of specimen in museum of Department of Pathology, University of Minnesota, showing extreme herniation of neck of diverticulum through fibers of inferior constrictor. The lower fibers of the crico-pharyngeus are found to be intact, encircling the lower end of the pharynx just below the lower margin of the neck of the diverticulum. The patient was a man, aged sixty-eight, history of regurgitation of food immediately after eating, duration three hours. The condition became increasingly severe, and diverticulum was unsuspected. Cause of death was lobar pneumonia.

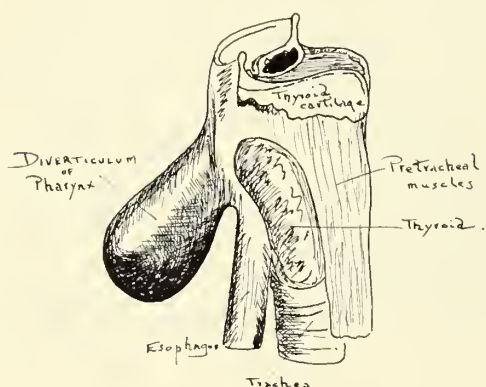


Fig. 6. Author's sketch of specimen from O. G., male, aged seventy-five at time of death. Health was good until five years previously, when he began to have difficulty in swallowing. This became worse in the last twenty months of life so that he was forced to depend on liquid food only. This, too, became too difficult to swallow readily, and toward the last he had to drink a quart of milk in order to get a pint of it into his stomach. Normal weight in health was 195 pounds; shortly prior to death 95 pounds. He was a recluse and had received no medical attention until through exhaustion he became helpless and a county charge, seen by me shortly before death. This sketch shows the lobulated stage before complete herniation through the constrictors of the pharynx above Killian's point has occurred. The constrictors are not shown.

lies behind the trachea and most often will be found underneath the inferior thyroid artery. In the larger sacs the inferior thyroid artery must be bisected in order to properly manipulate the sac. In doing this the recurrent laryngeal nerve must be avoided. The removal of small sacs has the possibility of the same accident in a lesser degree.

Thirdly, it is to be cautioned that traction on the

through the pylorus and that both the small and large intestines contain a large amount of air.

DR. J. F. CORBETT: I had a rather curious experience. A man came to me who was very hoarse, unable to speak distinctly and who had great difficulty in swallowing. I was unable to diagnose malignancy or diverticulum but on taking an x-ray I happened to find

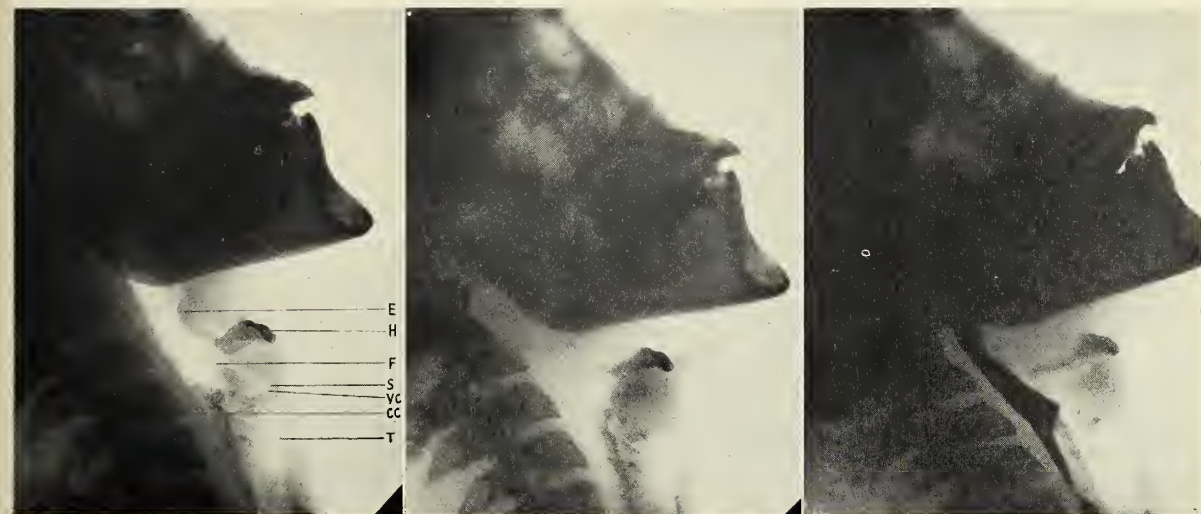


Fig. 1.

Fig. 2.

Fig. 3.

Roentgenograms made in the lateral direction of the pharynx and cervical region before and during the act of swallowing.

Fig. 1. The distribution of air in the pharynx and larynx during quiet respiration.

Fig. 2. The obliteration of air from the pharynx and larynx during the act of swallowing non-opaque saliva.

Fig. 3. The opaque bolus of thick barium paste passing through the pharynx and the upper end of the esophagus.

E—epiglottis; H—hyoid bone; S—air in the sinus between the true and false vocal cords; VC—true vocal cords; CC—calcification in the posterior part of the cricoid cartilage; T—air in the trachea; F—ary-epiglottic folds. (See discussion by Dr. Morse.)

large sac will frequently cause a kink in the esophagus which will be very embarrassing after the sac has been removed and recovery has been made.

No matter how well the operation is done, scar tissue is created at the site of the former attachment of the sac to the esophagus. This often results in a bulging or dilatation of the esophagus above the point of former attachment. Because of this dilatation a roentgenologist may inform you later that the sac has recurred. To avoid this complication the surgeon should dilate the esophagus soon after the extirpation of the sac. This should be repeated at intervals until the tissues again become pliable and then the results will be good.

DR. A. T. MANN: I would like to ask Dr. Morse a question. The film, before swallowing, shows an air space in the pharynx. On swallowing, that is obliterated. Where does the air go? Is that the air that we have in our intestines, and, if so, would the eating of small boluses and more swallowing give a greater amount of air and more distress than the swallowing of larger boluses?

DR. R. W. MORSE: I do not believe we know what becomes of this air; probably some of it is forced into the nasal pharynx before that cavity is closed with the soft palate. There is no doubt that some air is swallowed with a bolus of food. In the great majority of cases, with the first swallow of barium, air does not go down into the esophagus. I rather feel, myself, that a great deal of the air in the gastrointestinal tract is swallowed air but some of it may be manufactured *in situ*.

In children we find some who swallow large amounts of air and in those children you find the air has passed

a tonsil snare in his neck and it occupied the position which has been described tonight for pharyngeal diverticula. I went in from the outside and after searching a long period of time I was finally rewarded by finding the piece of wire. This was caught around the recurrent nerve as it entered the trachea and the other end of it had engaged itself in the pharynx. I removed this with no attempt to make a repair of the hole, as I could not find it, and eventually the man recovered.

This is being reported as one of the curiosities and one of the accidents which do occur.

DR. J. M. HAYES: It was my privilege to have assisted Dr. Judd at one time when he was doing these cases at the clinic. As those of you who have seen him shell these out, know, it seems very simple in his hands. As Dr. Nordland has said, the danger of a posterior mediastinal infection is the important factor. The two-stage operation was devised for the purpose of avoiding this infection. By bringing this sac up to the exterior and letting the area fill in below, the danger of this infection is practically avoided. I have seen one posterior mediastinal infection follow a one-stage operation. This infection is usually fatal.

DR. O. WANGENSTEEN: I have been interested, as some of you may know, in the source of gas in the intestinal canal. Last summer in the experimental laboratory of surgery Dr. Charles Rea and I did an experiment which has a direct bearing on this discussion. McIver and his associates have shown that the chief source of gas in the distended stomach is swallowed air. The use of the nasal catheter and suction in prophylactically preventing intestinal distension after abdominal operations tends to indicate that the main factor in all intestinal distension is swallowed air.

More direct proof of this inference was obtained by

completely sectioning the cervical esophagus in dogs. The distal ileum was obstructed by severing and inverting the ends of the gut. Two days later, much to our astonishment, the stomach and gut were still distended with air. When the distal end of the cervical esophagus was inverted, however, and the ileum subsequently obstructed, the stomach and small intestine were invariably found collapsed at autopsy. The gut contained only little fluid and a small quantity of gas. There was no distension.

Apparently the dogs may still swallow air after complete transection of the esophagus. This experiment demonstrates very well that swallowed air is the chief source of gaseous distension of the intestinal canal. Later, similar experiments were done obstructing the pelvic colon. These dogs survived much longer. Some gas and fluid were present in the intestines of these animals, but considerably less than when the oral source remained in continuity with the remainder of the intestinal canal.

Considerable gas is formed in the upper regions of the intestinal canal in the process of digestion, but this is largely CO_2 and is not an important factor in intestinal distention because it is readily absorbed. In the lower gut, however, gases are formed as a result of bacterial activity and are not readily absorbed. The quantity of such gas, however, is small contrasted with the large amount which may be swallowed.

The determinations of Dr. McIver and his associates on the nature of the gas in dilated stomachs showed it to be essentially air, in which nitrogen constituted the greater amount and oxygen was present in concentrations somewhat less than in atmospheric air. Dr. James Hibbard and I have been determining the chemical composition of gas in various kinds of intestinal distention, and he will later report the results of these observations.

DR. GILBERT COTTAM: The main point of my paper was to establish the fact of the constant location of these symptom-producing diverticula in the lower part of the pharynx, posteriorly. If we accept this and follow it our task in dealing with these lesions is greatly simplified. I hardly mentioned the clinical features but since these have been dwelt on in the discussion I will say this, that in competent hands operations for these conditions give very satisfactory results that are almost dramatic in certain instances.

I have in mind the case of a man, aged 60, in whom a diagnosis of carcinoma of the lower end of the esophagus had been previously mistakenly made on the clinical symptoms, without x-ray confirmation. Our pictures showed a typical diverticulum of the pharynx which for five years past had caused annoying and embarrassing regurgitation of undigested food soon after eating, with weight loss of 40 pounds. He had become a recluse and markedly despondent. After a two-stage operation he proceeded to gain back all the weight he had lost, had no more trouble with either swallowing or retaining all his food and soon regained his place in society with a normal mental outlook. Nor is this an isolated example. All the cases I have seen have had, in some degree, the same train of symptoms; regurgitation of undigested food, difficulty of swallowing, marked weight loss and some degree of mental depression. These should always arouse suspicion of a pharyngeal diverticulum and the x-ray examination does the rest, as far as the diagnosis is concerned. For relief, the two-stage operation is now the method of choice, using an ample incision along the anterior border of the sterno-mastoid, centered on the cricoid cartilage. The first stage is best done under gas-oxygen, or ethylene; the second, a week or ten days later, under novocaine, both with a minimum of bed confinement.

GAS GANGRENE INFECTION

(Report of Four Cases)

JOHN M. FEENEY, M.D.

Gas gangrene is a disease which has been known to exist for many years.⁶ Hippocrates, writing of a case of gangrene (though it is not quite clear that it was of the emphysematous variety), said: "Criton of Thaso commenced to experience pain in his foot, in his great toe—he went to bed the same day. He had a slight chill, some nausea, and then a little fever; he became delirious during the night. On the second day there was swelling of the entire foot over the whole ankle, which was a little red and tender; there were present tiny black blebs and he had a great fever. The sick one was completely out of his head. There was frequent evacuation of bilious matter. He died the second day after the onset of the illness." Celsus knew something about the disease as it occurred in pregnancy, for on extraction of the dead fetus he wrote: "It may so happen that the child may be distended with a humor from which there flows a fluid with a fetid odor."

After these two earlier writings, there is a long period during which the disease is not mentioned in medical literature. J. de Vigo and Ambroise Paré do not refer to it in their writing. Quesnay,⁶ in 1745, in a chapter on "Gangrene of Putrid Dissolution of the Humeral Mass," gave Peyronnie the credit of being the first to describe and to furnish exact observation on gas gangrene, and spoke of "The subcutaneous emphysema, the crysipelatous color of the skin, and the rapidity of death. . . ." De la Motte in 1771 published two articles which have been accepted by some as possible cases of gangrene. Thomas Kirland in 1786 knew and called it gangrene of the emphysematous type. Larrey, early in the nineteenth century, during the Napoleonic wars, knew the infection. In his articles he spoke of the rapid spread of the infection which in a few hours spread from the injured limb and was often fatal in less than ten hours. In 1829 Valpeau mentioned it as a complication in fractures. Trifaud states that Renaut and Charveau were among the first to reproduce the disease in experiments on animals.

With the onset of bacteriology, the organisms found associated with the disease were studied by various men. Pasteur isolated the vibron septicum. Koch the bacillus of malignant edema, and Welsh the gas bacillus. Fraenkel von Hibbler and Weinberg have done prominent work in this field. Clinically this disease has been described by Stolz (1902), Cramp (1912), and Seconds (1915).

Volumes were written about the disease during and following the World War. From among a large number of papers appearing at this time perhaps the best articles are found in the Surgeon General's Report (U.S.A.), the Report of the Medical Council of Great Britain, and Coenen's Monograph on "Der Gasbrand."

Etiology.—Although *B. Welchii* or *Bacillus perfringens* may represent the most important specific organisms involved in gas gangrene, mention should also be made of other organisms. Vincent⁶ claims that *Bacillus septicus*, or the malignant edema of Koch, is found in 10 per cent of the cases. Most bacteriologists, especially the French, English and Americans, believe that Koch isolated an organism which corresponds to the *Bacillus sporogens* of Metchnikoff, while most German bacteriologists feel that Koch's organism represented the true bacillus of malignant edema. Other gas producing organisms which are found associated with *B. Welchii* are, *B. edematiens* and *B. histolyticus*. Accompanying these organisms may be found *B. proteus vulgaris*, streptococci, staphylococci and other forms. The average incubation period is from three to five days.

Diagnosis.—The history is of some importance in that it may tell you that the wound has been contaminated by dirt or bits of clothing, or a crushing type of injury that does considerable muscle damage. There are no

definite lymphatics in skeletal muscle. The whole bundle acts as a lymphatic space, so when muscle is traumatized this constitutes a break in the circulation which results in edema. With the toxins that are produced there is further muscle destruction and hemolysis of the blood clot. Gas is formed and forces itself up and down the muscle bundle, opening up new fields for the bacteria. "That the gas has sufficient force may be visualized when we consider the experiments of Taylor.⁸ He connected an autoclave gauge, by means of a rubber tube, to a culture tube of dextrose malt inoculated with *Clostridium Welchii*. Within two hours the pressure began to rise and in six hours it had reached a pressure of twenty-three pounds. Manson⁴ states he has obtained a pressure of thirty pounds in twenty-four hours incubation."

The increased pressure, the occlusion of the lymphatic and the edema, finally lead to venous congestion and obstruction. This is followed by muscle degeneration due to lack of nutrition. With an impairment of the blood supply at this area there is a lack of leukocytes and the infection spreads rapidly. An infection may be well advanced in two hours and a whole limb can become involved in twenty-four hours.

"The literature contains twenty-two cases of gas gangrene after hypodermic injection.⁷ The medications used were caffeine, camphorated oil, digalen, scopolamine, novocaine, tincture of musk, physiological serum, asthonolysis, morphine, and adrenalin." A number of cases of gas gangrene have been reported after operations on internal organs: five after appendicitis, two following herniotomy, three after resection of the stomach, and one each after cholecystitis and ileus due to strangulation. The anaërobic exciters cannot live in internal organs because of the good blood supply, but they have been demonstrated in an appendix occluded by fecal stones.

Pain is usually an early symptom and of a distensive type, the patient usually complaining that his bandage feels too tight. The pain is usually more severe than you would expect with the type of injury. The odor is quite characteristic and is a sweetish, pungent, nauseating one. The skin has a brownish or gun-metal appearance with blebs. There is a brownish serum that exudes from the tissue and gas in the wound makes the picture complete. The gas may be felt as crepitation under the skin or may be heard with a stethoscope. X-ray is a valuable aid in making an early diagnosis, as one is not always certain whether or not he gets definite crepitation on palpation, where there is edema present. As the disease progresses, the patient usually exhibits symptoms of toxemia with rapid pulse and rise in temperature.

The organisms may be obtained by smear and by culture. Smears from the wound as well as from the culture will show, if positive for *B. Welchii*, large Gram-positive, rod shaped organisms. Blood cultures are usually negative. In obtaining cultures some of the necrotic tissue should be taken. This should be inoculated into a freshly prepared medium and incubated under anaërobic conditions. After six or eight hours incubation, the appearance of gas bubbles points to the presence of *B. Welchii* or other anaërobic gas-forming organisms. *B. Welchii* and *Vibrio septique* have been found to be present in the alimentary canal of man and animals. *B. Welchii* may be isolated without difficulty from soil and polluted streams.

Treatment.—The treatment in these cases is primarily surgical. This cannot be stressed too strongly. Prophylactically a thorough debridement should be done, removing all damaged tissue and making the wound as mechanically clean as possible, removing all dirt or pieces of clothing that may be present. If a thorough and complete debridement were done, as a prophylactic measure, on all potential cases of gas bacillus infection, there would not be so many cases of gas gangrene.

Once the diagnosis has been made, no time must be lost in resorting to what may be termed "radical" surgery. The entire wound must be widely opened, the incisions to extend well beyond the infection. Each muscle bundle should be examined carefully as to color and contractility. All necrotic tissue must be removed. All pockets should be opened. All muscle that has a brownish discoloration, that does not bleed freely when cut and that has lost its contractility, should be excised until healthy muscle is encountered.

When an entire extremity is involved, amputation by the flap method is performed. The wound should be left entirely open and Dakin's tubes inserted and every possible recess or opening irrigated with Dakin's solution every two hours.

Sometimes, if the infection becomes localized, an excision of the affected muscle may be sufficient, as the infection is limited by the fascial compartments. Drummonds and Kellogg Speed have reported good results in this type of case.

Sufficient fluid intake should be maintained, using glucose, alkalies, together with blood transfusions. These often serve as a life-saving measure. There seems to be considerable divergence of opinion upon the value of polyvalent serum. Burnett¹ states that the polyvalent serum given early in sufficient amount intravenously will save life, limb and even tissue. He further states: "Although it does not replace surgery, it is a valuable adjunct and seems to decrease the amount of surgery necessary." He recommends giving 20 c.c. of concentrated or 100 c.c. of unconcentrated serum (representing 10,000 units perfringens 100 units vibrio septique, 200 units edematiens, 200 units sordellii and 25 units histolyticus). The serum should be given very slowly so as to avoid severe reactions. The dermal test in these cases is thought to be of some value. One to three therapeutic doses should be given, he states, every four to six hours. This should be continued until the wound looks healthy and there is an absence of gas bubbles and crepitation. In his series of six cases, there were five recoveries and one death from the disease. To one patient he gave twelve therapeutic doses in twenty-four hours with no bad effects. "Of the six patients receiving therapeutic doses, all except the one fatal case evidenced some reaction, severe urticaria in three, with joint pains in one, and the other two experienced mild urticaria. Two developed dyspnea and cough while receiving their last injections. Adrenalin readily controlled these reactions."

Most authorities at the present time feel that the antitoxin has a definite place in the treatment of this disease. It is recommended that 20 c.c., which represents 10,000 units perfringens and 10,000 units vibrio septique, be given every four to six hours. This can be given intravenously or intramuscularly. The intravenous method seems to be the preferable one.

In all suspicious cases where there has been considerable damage to muscle and tissue, the combination Tetanus-Gas Gangrene Antitoxin should be given. This contains 1,500 units of tetanus antitoxin, 1,000 units perfringens antitoxin and 1,000 units of vibrio septique.

Kelly,² over a period of three years, observed six cases of gas gangrene of the extremities which seemed to be benefited by the use of small doses of x-ray. This form of treatment was used merely as an aid in the treatment, and not with the exclusion of surgery and serum.

In a series of 607 cases³ of gas gangrene compiled by Miller and subject to analysis, he found that the mortality was 49.7 per cent. *B. Welchii* was found to be present in 38 per cent of these cases. "In this series of 607 cases there were 227 bone fractures, 143 of which were compound." In other words, 60.9 per cent of this series were fracture cases.

Manson³ reports two cases of gas gangrene following amputations of extremities that were the site of chronic ulcers. He also states that culture of thirty-

two ulcerating lesions revealed that eleven, or 34.37 per cent, harbored pathogenic gas-producing anaerobes.

CASE REPORTS

Case 1.—A man, aged forty-four, was brought to the hospital on May 17, 1930, directly after a traumatic amputation of the left arm just below the elbow joint. The patient was standing between two lumber trucks. A projecting "two by eight" plank caught on a passing truck, the end of the plank was driven forward, grazing the patient's chest and traumatically amputating his left arm.

On admission he was given a hypodermic of morphine sulphate gr. $\frac{1}{2}$ and atropine sulphate gr. $\frac{1}{150}$ and also 1,500 units of tetanus antitoxin. His pulse was 100, temperature 98.8° , blood pressure 130/90. Skin, fascia and muscles were torn with numerous cuts above the elbow joint on the dorsal surface. Muscles and skin were severed about ten inches below the elbow on the palmar surface. The elbow joint was bare on the medial side. The arm was prepared with mercuriochrome and the patient was given ethylene. Two and a half inches of ulna and one and one-half inches of radius were removed by the attending physician. All loose fragments of bone were removed and muscles loosely approximated over the end of the bone with a rubber drain inserted. A tourniquet was used to control hemorrhage. Normal saline was started during the operation. The operation took about thirty minutes and the patient left the table in good condition.

May 19, two days after the injury, his temperature was 99.2° , pulse 120, blood pressure 110/80, and crepitation was palpable over the elbow. X-rays taken of the chest were negative for fracture. He was taken to the operating room and under ethylene anesthesia a guillotine amputation in the middle one-third of the humerus was done with an extensive debridement of all involved muscles. The wound was left open. Culture made from the muscle showed gas bacillus present.

May 20, stump of the biceps muscle was found to be involved, so the patient was again taken to the operating room and this muscle, with the coracobrachialis, was resected.

May 21, Dakin's tubes were inserted and the wound was irrigated every two hours.

June 27, the wound was clean and the patient was again taken to the operating room and small pinch grafts were removed from the thigh and applied over the denuded area. Adhesive straps were also applied for traction so that the skin could be drawn over the raw area.

August 16, he was discharged from the hospital and the wound was practically healed. The patient was then given a short course of baking and massage to limber up the shoulder.

May 20, 1931, he was fitted with an artificial limb which he was wearing at the time of our last examination.

Dr. D. A. MacDonald was the attending physician in this case.

Case 2.—Male, aged thirty-eight, was admitted to Northwestern Hospital on October 19, 1930. On October 15 the patient got his right arm caught in a sprocket, and the flesh was torn on the arm above the elbow. October 17, two days after the injury, the arm became swollen, with bluish discoloration, and the diagnosis of gas gangrene was made by the attending physician. His arm was amputated through the middle third of the humerus. He was given gas bacillus antitoxin. The following day, October 18, the infection continued to spread and at the time he was admitted to Northwestern Hospital, on October 19, the infection had spread up beyond the shoulder and into the pectoral muscle. His temperature was 101° , pulse 115 and of poor quality. X-rays taken of the shoulder showed a marked amount of gas in the soft tissue of the right arm and shoulder, continuing over the tissues of the

chest wall. He was taken immediately to the operating room and under ethylene anesthesia he was operated upon. All the sutures were removed from the stump and a brownish serum exuded. An incision was made up to the shoulder and large skin flaps were thrown back over the anterior portion of the chest wall and each group of muscle was examined. Practically all the larger muscles of the arm were removed up to the shoulder. The debridement was carried over the anterior portion of the shoulder and chest. The wound was left entirely open. The patient's pulse became weak and could not be counted while on the table. Cultures showed short Gram-positive diplo-bacilli which formed gas in sugar broth. He left the table in poor condition.

October 21, the lower end of the flap became dark brown and a small piece of muscle on the medial side of the humerus was discolored. He was again taken to the operating room and given ethylene anesthesia, and the lower end of the flap and involved muscle were resected and about two inches of humerus. X-rays taken of the right side of the chest and shoulder showed evidence of considerable gas in the soft tissues about the stump, and in the shoulder girdle, but no gas over the chest wall. Nine Dakin tubes were inserted into the wound and the wound was irrigated every two hours with Dakin's solution. The evening after the second operation, the temperature rose from 100.4° to 102.4° with a pulse of 120. Fluid intake was well maintained and on the following day his temperature was down to 99.2° .

The patient continued to run a septic temperature until November 3. On November 27 the wound was clean. His temperature was normal. The smear showed many pus cells but no bacteria; so on November 28 he was taken to the operating room and, under gas, the skin edges were undercut on the upper, lateral and lower borders. A flap was swung up from the lower border of the axilla and complete closure of the wound was made. Two penrose drains were inserted and two Dakin's tubes. The wounds were irrigated every three hours with 10 c.c. Dakin's solution. The penrose drains were removed on December 8.

He was discharged from the hospital on December 30 with the arm about healed. The arm continued to drain and on January 13 he was readmitted to the hospital. Under general anesthesia the necrotic bone was removed from the end of the stump. The arm was entirely healed in six weeks time and he was fitted with an artificial limb which he is wearing at the present time.

Case 3.—Male, aged forty-six, was admitted to the hospital on March 2, 1931, about thirty minutes after his accident. A truck had turned over early in the morning and his left arm was pinned under the car. He received a severe laceration of the left shoulder, and suffered from considerable hemorrhage before the truck was jacked up and he was brought to the hospital.

The fractured humerus was set and the laceration was sewed with drainage, by the local doctor. He was first seen by us at a hospital at Northfield, Minn., about 2:00 p. m. on the same day, at which time his temperature was 101° , pulse 120 and thready. There was considerable serous drainage. Circulation in the hand was good. There was no evidence of crepitation, no odor and no gas could be palpated in the tissues. He also had a brachial plexus injury and was in an advanced degree of shock. Normal saline was started and he was given 3,000 c.c. within the next twenty-four hours, subcutaneously and by rectum.

On March 3, the day following the injury, he was again seen, at which time there was crepitation from the shoulder down to the elbow. The patient was delirious. His temperature was 102.4° , pulse 160, and irregular, blood pressure 70/30. Râles were heard over the right apex and axilla. He was taken immediately

to the operating room and the arm was disarticulated at the shoulder. His pulse was not palpable when he was put on the table. The operation was performed as a life-saving measure and only took a few minutes as the wound was left entirely open. The patient stopped breathing while dressings were being applied, but was given artificial respiration until he started breathing again. He died about thirty-five minutes after the operation.

Case 4.—A man, aged twenty-four, was in an automobile accident on May 16, 1931, and sustained an abrasion to the scalp and chin, and a laceration in the middle third of the right leg. He was taken immediately to Ancker Hospital where abrasions were cleaned and the laceration on the leg sutured with four dermal sutures.

On May 17 (twenty-four hours after the accident) he was seen by us, at which time there was slight redness around the laceration. Definite crepitation was present and there was some tenderness over this area. His temperature was 99.4°.

He was sent immediately to Northwestern Hospital where x-rays of the right leg showed no evidence of fracture, but evidence of gas in the soft tissues, extending up as far as the knee. His leukocyte count was 7,600, pulse 80, temperature 99.8°. Urine was negative. He was given 1,500 units of tetanus antitoxin, and 100 units of gas bacillus antitoxin. Under gas-ether anesthesia, an incision was made over the medial side of the leg extending from the lower portion of the knee to a few inches above the ankle. The entire infected mass, together with the skin surrounding the laceration, was removed. A small portion of the involved gastrocnemius was resected. The debridement was carried upward and the lower part of the capsule of the knee joint removed. The wound was left open and eight Dakin's tubes were inserted. Cultures from the tissue showed no growth in aerobic or anaerobic cultures.

On May 18 the patient was given 50 units of gas bacillus antitoxin. May 20, the patient developed a generalized adenitis which subsided in a few days. His temperature was 104.4°, pulse 120, and glands in the inguinal region, axilla and cervical regions were palpable and tender. Smears from the leg on May 25 showed no pus and no bacteria. Culture from the wound on June 6 showed staphylococci and pneumococci. The wound looked clean. June 6, the edges of the wound were infiltrated with 1 per cent novocaine and the skin was freed around the edges. The edges of the wound were approximated with heavy linen stay sutures. Twelve Dakin's tubes were inserted and the wound was irrigated every two hours. The patient was discharged from the hospital on July 19 with the wound practically healed. He has a normal function in the leg at the present time, but it gets colder and tires a little more easily than the left leg.

SUMMARY

1. Though the existence of gas gangrene has been known for a long time, little has been written on the subject previous to the World War.

2. The diagnosis is usually quite simple: the characteristic odor, a sweetish, pungent nauseating one; the skin, with its brownish or gun-metal appearance; the brownish serum which exudes from the wound; the presence of definite crepitation; all of these, plus x-rays showing gas bubbles in the tissue, form a complete gas gangrene picture.

3. The treatment of gas gangrene is accomplished through two methods: (1) primarily a surgical one, through the opening up of the entire wound, with excision of involved tissue, followed by irrigation with Dakin's solution; (2) through the administration of antitoxin.

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DISCUSSION

DR. R. T. KNIGHT: I would like to hear our President discuss this. I was with him when he had considerable experience with gas gangrene during the war and believe he should be asked to discuss it.

DR. KENNETH BULKLEY: It does happen that I saw a good many cases of gas bacillus infection. I had, on occasion, twenty-five to thirty of them under my care at the same time.

Dr. Feeney brought out a number of points which are important. In the first place, diagnosis. X-ray diagnosis of gas gangrene is pathognomonic but it is like waiting for fecal vomiting before making a diagnosis of intestinal obstruction. Diagnosis should and must be made even before x-ray findings are positive. The copper discoloration is characteristic and is produced by nothing else. There is a sharply demarcated edge, not raised, and I know of nothing else which produces quite the same picture.

The odor, of course, is always associated with an open wound and is characteristic. It is probably not due to the anaerobic infection alone. But it does not occur in infected wounds without anaerobic infection. The odor of real gas gangrene differs from any other odor I know.

It is, in reality, wholly a disease of muscle and consequently the treatment is that of muscle and nothing else. Surgical treatment is of greatest importance and consists of complete excision of every part of the involved muscle and all other devitalized structures irrespective of how mutilating the operation may be. It is a question of saving life.

Dr. Feeney mentioned one procedure which I entirely disapprove of. He spoke of Dakin's tubes. Actually, they are Carrel tubes, but I assume he referred to Dakin's solution. I know of no better culture medium for anaerobes, certainly clinically, than Dakin's solution. If you wish to encourage the growth of anaerobes in a case in which you have done muscle resection, use Dakin's solution. If you wish to kill the patient, use Dakin's solution. We used Carrel technic on a large number of cases and we obtained, by all odds, our best results and our lowest mortality, by using Carrel technic with a 1 per cent solution of acetic acid. I would recommend it highly. It is not irritating to the skin and, in my experience, is far superior to Dakin's solution.

I have nothing further to add other than that the mortality rate in the small number of cases reported tonight was reasonably low.

A number of years ago, in New York, Dr. Worcester, associated with me, reported eleven cases of gas gangrene in civilian life, and, I believe, of those eleven three followed excisions and dissections of fistulae in ano.

I think Dr. Feeney is to be congratulated on the presentation of this subject inasmuch as gas gangrene occurs so relatively infrequently in civilian life that if

not occasionally brought to our attention it is apt to be overlooked.

DR. T. H. SWEETSER: I had some experience with this, not in a surgical ward but in the laboratory, and I want to testify to the necessity for promptness. I do not think one should wait on the laboratory at all after making the diagnosis. There are a few interesting points which might come from the laboratory. One of them is that these infections, as they clinically appear, are practically always mixed anaerobic infections and sometimes anaerobes with either streptococci or staphylococci. Another interesting point is that there are cases of infection, especially where the *Bacillus edematiensis* predominates, in which there is no gas but there is gangrene of the muscles. The need of promptness is emphasized by a fact which was not mentioned and which we found in autopsies, namely, that metastatic gas gangrene occurs occasionally.

The laboratory can help you by very rapid cultural methods which are not seen very often at present and are not emphasized in civilian work. If some of these sound secretions are cultured in an anaerobic milk culture and also in a deep anaerobic agar culture as well as on blood agar, one can, within about six to eight hours, pick up the stormy fermentation of *B. Welchii* in the milk culture, the forms of various anaerobic colonies in the deep agar culture, and the hemolytic colonies of streptococci and staphylococci on the blood agar plate. Those three cultures checked by smears from the cultures stained by Gram's stain will give a quite accurate picture of the wound infection.

DR. R. C. WEBB: I feel that the use of Dakin's solution in gas gangrene cases is quite justified. Carrel said that Dakin's solution cannot be expected to travel up Haversian canals or penetrate the tissues. This solution and its use were the product of a chemist and a surgeon and surgical procedure cannot be abandoned in favor of the solution. In gas gangrene the involved tissue must all be removed with the knife. During the war I was connected with the Evacuation Hospital Number Eight and the cases handled by this hospital were the severely wounded.

In a series of 500 consecutive cases of compound fractures, cultures were made and all showed gas bacillus organisms in the wounds. In a series of 4,377 cases this hospital handled 288 cases which developed gas gangrene and among 401 personal cases there were 26 cases of gas gangrene. All of these patients, when operated upon, were treated after the Carrel-Dakin method although only a few of the surgeons had had actual instruction from Carrel.

Dakin's solution, I believe, served a very useful purpose in taking care of the surface infection after a proper operation, and also the Dakin's solution hastened the removal of necrotic tissue, which can afford a harbor for live organisms of any kind.

DR. R. T. KNIGHT: Of course, Dr. Bulkley and I did not hear quite as many guns as Dr. Webb did, and then Dr. Webb's hospital was an evacuation hospital so the wounded were not kept there very long. We saw quite a number of these cases from there that were treated with Dakin's solution. Of course, he did not keep them there and keep on using Dakin's solution. The solution is very good for mixed infections before gas gangrene has started, but after it has started it is certainly true that the acetic acid does the job better. A good many cases came back from Dr. Webb's hospital and had gas gangrene after leaving there. We had an opportunity then to use the acetic solution and it proved satisfactory. Of course, any antiseptic treatment for gas gangrene should be used only as an adjunct to efficient surgical removal of all involved muscle as far as this is possible.

DR. G. R. DUNN: A thorough debridement is, undoubtedly, of primary importance in the treatment of gas bacillus infection developing in a wound. Whether or not one obtains a cure is determined by the thor-

ough removal of all involved and devitalized tissue. The use of serum may help a little. After a debridement one frequently has a large wound in which prevention or control of secondary infection is of great importance. Dakin's solution is far superior, I believe, to dilute acetic acid in this respect.

DR. GILBERT COTTAM: I have had a fair number of gas bacillus cases in my experience, perhaps a dozen or fifteen in all, and these in civil life, for in France my work was all in a base hospital behind the lines. Bacteriological studies were made in most of my cases and invariably mixed infection was found. When the gas bacillus was separated in pure culture in the laboratory there was no such foul or putrid odor as has been mentioned tonight. The odor of the pure cultures was rather of a sweetish nature. The gas bacillus is non-proteolytic, and therefore by itself does not create a bad odor in tissues, but when contaminated with the pyogenic organisms or with the colon bacillus or both, the result is different and the stench may be terrific.

We should always be on the lookout for the possibility of gas bacillus infection in any case where there has been a chance of fecal contamination, either human or animal, for the intestinal tract of man or beast is the normal habitat for the gas bacillus. Any accidental wound which has been exposed to street debris or the unwashed hand or is in any part of the body where direct fecal contact is possible, should be looked on as a potential gas bacillus case and treated accordingly with ample air exposure and serum administration. Such wounds are better left unsutured at first and a punctured wound should be laid open freely, for we are dealing with anaerobes. If gas bacillus infection appears, nice judgment is needed to know how far to go, for there is great variance in virulence and in the resistance of the individual, and radical intervention may be necessary in some cases while conservatism may suffice in others. No hard and fast rule can be laid down. A bit of experience is the best guide.

DR. J. M. FEENEY: I still feel that Dakin's solution is as good, if not better, than any other solution in the treatment of gas gangrene. It is an oxidizing agent that is effective and beneficial in combating pathogenic anaerobes. Dr. Cottam is right when he states that *B. Welchii* is seldom found in pure culture; for *Vibrio Septique*, *B. histolyticus* and various streptococci or staphylococci are usually associated with it.

F. A. OLSON, *Secretary*.

THE DESIGNATIONS "FOOD CONCENTRATE" AND "SCIENTIFIC FOOD CONCENTRATE" FOR FOODS

The Committee on Foods reports that the terms "food concentrate" and "scientific food concentrate" are common designations in current advertising for food mixtures consisting mainly of sucrose, malt extract and cocoa, with a relatively small proportion of dried milk or skim milk and possibly a small quantity of dried egg. These mixtures are used chiefly for preparing chocolate and malt flavored, sweetened milk drinks. The designations as used, implying a direct process of concentration in the manufacture of the foods concerned, are unnecessary for describing the products, are likely to be misunderstood by the public, are not informative, incorrectly convey the meaning of extraordinary food value, and are misleading by implication. The term "concentrate" should be reserved for concentrated solutions of flavors or fruit juices which must be diluted for use, for highly potent vitamin preparations, or for concentrated extracts of foods which are recognized technically as concentrates and for which products the term "concentrate" is not misleading in fact or by connotation. (Jour. A. M. A., September 23, 1933, p. 1000).

PROCEEDINGS of the MINNESOTA ACADEMY OF MEDICINE

Meeting of February 14, 1934

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, February 14, 1934. Dinner was served at 7 o'clock, and the meeting was called to order at 8 o'clock by the president, Dr. A. E. Wilcox.

There were fifty-one members and one visitor present. Minutes of the January meeting were read and approved.

The scientific program was as follows:

DISSEMINATED LUPUS ERYTHEMATOSUS

PAUL A. O'LEARY, M.D.

Rochester, Minn.

Dr. O'Leary read his thesis on the above subject, and several lantern slides of cases were shown (to appear later in MINNESOTA MEDICINE).

ABSTRACT

Disseminated lupus erythematosus is of two types, namely, acute and subacute. The acute type is frequently a rapidly progressive disease, the life expectancy in such cases being a year or less; while the subacute type runs a milder, slower course, is characterized by remissions in both the constitutional and cutaneous symptoms, and has a mortality rate of approximately 30 per cent. Both diseases are characterized by protracted illness, marked constitutional symptoms, and are frequently ushered in by symptoms indicating a toxic process. Both forms of the disseminated type may appear as a result of dissemination of a localized lupus erythematosus or may start primarily as a disseminated form of the disease.

A group of forty-seven cases is studied, and autopsies on ten of the acute type are reviewed, particularly for evidence of tuberculosis. The findings show a comparatively low incidence of tuberculosis, suggesting that tuberculosis is not a factor in the cause of death in patients with disseminated lupus erythematosus.

DISCUSSION

DR. C. D. FREEMAN (Saint Paul): To dermatologists, the simplest thing about lupus erythematosus is the diagnosis. It is only occasionally that we are unable to recognize this condition.

When we come to etiology it is different. In general I agree with what Dr. O'Leary has said. I received recently a reprint from Dr. Otto Kren, of Vienna, whom many of us know and respect very much. Kren emphasizes blood cultures and claims that lupus erythematosus is due 100 per cent to tuberculosis. He takes bi-monthly examinations over a period of many months. He stresses the importance of many examinations; in from one to three examinations his results are from 20 to 57 per cent positive, and in from four to ten examinations they are 100 per cent positive. I would like to know if Dr. O'Leary has done any of this work over long periods. This seems to be the essential factor, according to Kren and Lowenstein. One negative examination means nothing to them. This was not my conception of the disease, although tuberculosis must always be taken into consideration. Kren's and Lowenstein's findings have not been verified by other workers along this line.

As far as therapy is concerned, it is rather unsatisfactory. I had one case of the discoid type, rather inactive, superficial or so-called non-scarring type, in which I gave 25 mg. of gold sodium thiosulphate, and the patient promptly developed the disseminated variety and with an almost serious outcome. I also know of one other similar case in the Twin Cities. Regardless of the fact that gold is one of our best therapeutic agents for this disease when properly administered,

there is always a possibility of a reaction. And a therapy which one cannot use in all types of a disease, as for instance in syphilis, strikes me as though we are not exactly on the right track.

An argument against tuberculosis as a causative factor is that sunlight is contraindicated in lupus erythematosus, while in most other tuberculous conditions sunlight is beneficial when proper exposures are made. Dr. Butler had a patient in whom long exposure to sunlight precipitated a very active lupus erythematosus on the exposed areas. She had never had any trouble previous to that time. As I recall, the termination was fatal in a few months.

As stated above, the diagnosis is comparatively easy, the etiology still in doubt, and the therapy, although at times giving striking results, is unsatisfactory.

I enjoyed Dr. O'Leary's paper and slides very much. He covered the field without any exaggerations or false claims and those interested should have a good idea of the present status of lupus erythematosus.

DR. J. M. ARMSTRONG (Saint Paul): I would like to report a case of acute disseminated lupus erythematosus that recovered. The case is unique. But I wish first to make a few remarks about acute disseminated lupus erythematosus as I have seen it. In the first place, it seems to me that in every case I have seen there is a rather peculiar mental picture—a dread of something impending. I have seen seven cases and five of these died of pulmonary edema; I suppose it might have been pneumonia but it was pretty rapid.

The patient I mentioned was a married woman 27 years of age, whom I saw September 24, 1928. At that time she had an acute disseminated lupus erythematosus. She stated that it began on the right side of the nose on the 17th of the preceding August. When I saw her there were lesions on the nose, cheeks, ears, backs of the fingers, and also some lesions on the forearm. She said it had spread to the fingers and back of her ears inside of two weeks. There were also lesions about the genitals, and it appeared there before it appeared on the chest. There is a reason for that. At the time she consulted me on September 24th, she had a baby seven and a half months old and she was six and a half months pregnant, so she became pregnant on the first ovulation after her baby was born. She had been living in California and got into the hands of some irregular practitioners. She was told she must see a pediatrician after her baby was born and he immediately told her she was not to nurse the baby, although she told me she had plenty of milk. Two weeks after her confinement she was passed on to a surgeon who said she needed a cervical repair. She was then told she had tuberculosis. At the time this eruption appeared on her face she went back to the same doctors and was told she had ringworm. That did not clear up fast enough and she was passed on to another, who told her she had gonorrhea and syphilis.

I saw her on September 24 and by October 10 these lesions had spread over the entire body and were confluent on the body, arms and lower limbs. Edema was beginning to be noticeable on the entire body. On the 12th she was sent to the hospital. X-rays of the chest revealed nothing. The urine was negative. She never had very much temperature, 102° being the highest. As a matter of fact, she felt very comfortable. There was no itching but she described the feeling of the skin as one of formication. Her mentality was perfectly clear. On the 12th there commenced to be some crepitus and râles in the lungs and we informed the husband that we did not think she could go on to term. On the morning of the 18th her condition became so bad that a bag was inserted in the cervix and the child was born at 2:30. Within 24 hours after the uterus was

emptied all the edema of the skin cleared up and the lesions began to disappear, and by the 6th of November every vestige of the eruption was gone. There was some telangiectasia on the inside of the thighs but this may have been there before. She became absolutely well and eight months afterward consulted another physician, who removed her tonsils. I did not see her again but met her husband a year afterward and he said she was entirely well.

Of course this does not throw any light on the etiology.

DR. S. E. SWEITZER (Minneapolis): I would like to congratulate Dr. O'Leary on this very fine paper. It emphasizes the fact that we know very little about acute lupus erythematosus. I just want to state, in regard to Dr. Freeman's question, that we have done some work on the etiology of acute lupus erythematosus as regards tuberculosis. Dr. Laymon made a number of blood cultures on lupus erythematosus and on acute tuberculosis cases, and his findings were negative. Dr. Laymon's cases have been published. We could not discover the findings which Dr. Kren reports, and I think others have had similar experience. Personally, I don't think acute lupus erythematosus has anything to do with tuberculosis. As far as my conception of this disease goes, we do not know anything about the etiology. We assume that discoid lupus erythematosus can be caused by tuberculosis, and they may go along for years, then become acute. I had one patient with discoid lupus erythematosus who had some bad teeth, and sent the patient to the dental department at the hospital with the request to pull one tooth at a time. But they pulled a number of them at once. The patient immediately developed acute lupus erythematosus, with a very exudative eruption of the face, body and extremities. She developed symptoms of pulmonary involvement and promptly died. We were unable to get an autopsy on that case but we have on others. I think when they get acute lupus erythematosus they promptly die within a very few months. This type sometimes occurs after the chronic discoid type has existed for years.

DR. F. R. WRIGHT (Minneapolis): Two things have come up in this discussion which are particularly interesting to me. Dr. Armstrong reports a case of lupus erythematosus which immediately got well when the pregnancy was terminated. Dr. O'Leary reported the case of a woman whose lupus erythematosus became worse when she became pregnant. There is a certain type of toxemia which may accompany pregnancy. Now the question is, in Dr. O'Leary's case, was this a normal pregnancy or was it producing a toxemia? And in Dr. Armstrong's case, was this producing a toxemia which was relieved as soon as the pregnancy was terminated? It is true in this country that we advise against pregnancy for a young married woman who has incipient tuberculosis because it may aggravate her condition. But in Germany, where they are fairly careful, they encourage the tuberculous woman to become pregnant because there is never a time in a woman's life when her nutrition is so high as when she is pregnant.

DR. F. C. RODDA (Minneapolis): The reaction of different individuals to infections and body insults varies widely. For instance, a dose of medicine, an exposure to sunshine, an infection, may produce radically different results in different individuals. Some of these reactions we know to be due to allergy. In comparing the chronic with the acutely fatal form of lupus erythematosus, I wonder how large a rôle allergic manifestations play in the latter type?

DR. JOHN BUTLER (Minneapolis): I was much pleased to hear this excellent presentation by Dr. O'Leary. I think the diagnosis of this rare disease is important to many of the members present. Some years ago, in looking over the literature on erythema multiforme, I found a report by Osler (1905) in which

he had described thirteen cases of erythema multiforme with skin and visceral manifestations. He considered these cases carefully, and, on account of the variable character of the lesions, placed them in the erythema multiforme group. Three of these patients died. We know that erythema multiforme is a skin disease with little or no systemic disturbance. Patients do not die of this disease. It is quite possible that the fatal cases described by Osler were examples of acute disseminated lupus erythematosus. Typhoid fever may have been confused with the same disease.

Another condition which I don't remember that Dr. O'Leary mentioned is Kaposi's erysipelas perstans faciei, which is considered a variant of disseminated lupus erythematosus. Dr. Sweitzer had such a case at the University Hospital some years ago. The disease simulated, in many respects, a severe erysipelas of the face and scalp, with high fever. The scalp hair came out. The casual observer would probably have diagnosed it as a case of erysipelas. Later erythematous plaques developed in the upper and lower extremities and the patient died of a disseminated lupus erythematosus. Another exciting factor in this disease is photosensitivity; there are a number of cases reported where the disease developed following a severe sunburn. I had such a case, which was also observed by Drs. Freeman, Sweitzer and Michelson. The patient was a girl 26 years of age. Four weeks after the sunburn she developed discoid patches over the bridge of the nose and cheeks. I considered it lupus erythematosus of the chronic discoid variety. The patient was not apprehensive and felt well at that time. A few weeks later there developed erythematous patches on the extremities; she began running a temperature and died in two months time of a disseminated lupus erythematosus. The necropsy showed no signs of active or healed tuberculosis. The lymph glands were carefully studied. While earlier blood cultures were negative, the terminal infection was that of a streptococcal septicemia.

Twenty-five years ago the Austrian and German schools favored a tuberculous etiology in this disease. I am surprised to learn that Dr. Kren considers it 100 per cent due to the tubercle bacillus. The recent literature of the French, English, and American is fast getting away from a tuberculous etiology in this disease. I venture to say, if you take many fatal skin diseases of unknown cause, such as pemphigus, mycosis fungoides, lymphogranulomatosis cutis, etc., that the necropsy findings will show no greater or less incidence of active or healed tuberculosis than is found in disseminated lupus erythematosus.

DR. H. E. MICHELSON (Minneapolis): Dr. O'Leary has illustrated and defined for you in a beautiful manner the syndrome that we call acute disseminated lupus erythematosus. This condition, no doubt, is a constitutional disease with skin manifestations. One might take up every system of organs in the body and enumerate the symptoms of this disease which are encountered. For example, there are ocular symptoms, nervous symptoms and kidney symptoms; and, in fact, there is practically no portion of the body that might not be involved. The etiological factors have not been discovered with certainty. The two leading views are, first, that this condition is a form of sepsis; and the second is based on an assumption that there is a tuberculous septicemia. To me, it appears that the disease is of multiple etiology and that probably any number of various factors can evoke the syndrome. It seems certain that the patient must be the proper type for such an outburst, as is evidenced by the fact that some mild cases of lupus erythematosus can be suddenly changed into very severe ones by some almost negligible factor, such as exposure to sunlight, while other patients with severe localized lupus erythematosus may have every manner of treatment and physical abuse and still have no dissemination. The liver may play an important part. Certainly, there is no known pathology or specific treatment. However, early recog-

nition most certainly saves the patient from treatments which definitely hasten the termination.

DR. A. E. SMITH (Minneapolis): I would like to ask if the diurnal temperature range has been studied in these cases. In tuberculosis of the eye, I studied the diurnal temperatures and found subnormal morning temperature and very decided diurnal range in all those cases that had a tuberculous etiology.

DR. O'LEARY (in closing): Dr. Michelson has answered the question which Dr. Freeman asked in regard to Kren. The fact that Kren is able to obtain 100 per cent positive evidence of tuberculosis in lupus erythematosus, while other workers, using the same methods, have obtained negative results is a severe criticism of his work. It is impossible to interpret such discrepancies without more data on Kren's technic. Likewise, the low incidence of tuberculosis in the autopsied cases reported in this country is against Kren's work.

I would classify Dr. Armstrong's case as of the subacute type of lupus erythematosus disseminatus. There has been a mortality of 100 per cent in the acute types of disseminated lupus erythematosus in my group of cases, while in the subacute types one-third of the cases have apparently been cured, another third are in remission, and the remaining one-third have died.

The question of allergy raised by Dr. Rodda is the most vital point brought out in the discussion. We have been undertaking cultural studies for the past few years but have not reached a point where we have much to talk about. The cultural studies indicate quite definitely that the disease is an infectious one and the causative organism probably plays the rôle of an allergon in the production of the syndrome of disseminated lupus erythematosus.

Apropos of Dr. Butler's remarks, I endeavor to avoid the use of the numerous terms, many of which are purely descriptive, which have been recommended for unusual types of this disease. I have felt that the types of lupus erythematosus which have a bizarre aspect should not be given a new name.

Dr. Michelson has summed up the situation very well by saying that lupus erythematosus is a constitutional disease of which the dermatological phases are a small part, and our therapeutic efforts must be directed toward the systemic manifestations rather than the cutaneous lesions.

SINUSITIS AND ASTHMA

CHARLES E. CONNOR, M.D.

Saint Paul

(To appear in MINNESOTA MEDICINE)

ABSTRACT

1. Either allergy or infection or both may be responsible for nasal hyperplasia.
2. Every effort should be made to recognize the presence of and evaluate the relative importance of these two factors.
3. No case of asthma should be submitted to surgery until every effort has been made to eliminate or control all allergic factors.
4. Suppurative lesions in the nose and accessory sinuses of asthmatics should be dealt with on the indications ordinarily recognized in non-asthmatics.
5. The removal of non-suppurative foci of infection from the nose and accessory sinuses in intrinsic asthma will usually result in marked and fairly permanent improvement, but not cure, in their local manifestations, obstruction, discharge and acute head infections, and in improvement or cessation of the asthma which, however, is not permanent, the period of freedom from attacks lasting from one to several months, the average being four to six. Operation should not be offered in such type of case as a cure for asthma.

6. Non-suppurative foci of infection in the nose or accessory sinuses in intrinsic asthma may occasionally be treated surgically in selected cases in an effort to indirectly affect the asthma by improving the general condition of the patient, by lessening the tendency of involvement of the lower tracheo-bronchial tree, or by removing local conditions which predispose to the so-called "trigger attacks" of acute head infection and consequent asthma.

DISCUSSION

DR. E. J. HUENEKENS (Minneapolis): I can commend unreservedly the standpoint Dr. Connor has taken, but would like to emphasize certain factors. My own conception of asthma is that it is a constitutional diathesis which lasts throughout life. We cannot change this diathesis by any treatment, but if we can remove the exciting cause, whether it be food, pollen, or animal emanation, we may symptomatically cure the patient. In children under five years of age, the exciting cause is frequently infection with fever. If we can prevent the recurrence of infections in such children they may be symptomatically cured. Vaccines, large doses of Vitamin A, ultra violet radiation, have largely been a failure in preventing such infections. The only way in which we can do so is by removing the focus of infection, whether it be tonsils, adenoids or maxillary sinuses. If this is done some of the cases will be symptomatically cured. I have one boy who has been without an attack for fifteen years. In other cases asthmatic attacks return less often, but the patient will experience enough relief to make the operation worth while. In cases with marked asthmatic diathesis there may be no relief. By choosing our cases carefully and determining the exciting cause, both by history and personal observation, we will find that a respectable percentage of cases in which other types of treatment have failed can be relieved by removing the foci of infection.

DR. F. C. RODDA (Minneapolis): In the discussion of asthma, I think some confusion arises from an improper nomenclature. In certain cases an inspection of the mucous membrane of the nose and throat shows a swollen, grayish, soggy appearance. The different breathing is chronic and persisting. Sensitization tests are frequently of little aid. For instance, a positive food reaction may occur, but we learn the patient never takes this particular food. Removal of tonsils and adenoids helps but little. These are cases of true asthma and are most discouraging to treat. However, there is another class of cases of acute, self-limited attacks of asthmatic type of breathing. On auscultation of the chest, one hears all manner of râles—a veritable music box. Now, these cases are always associated with acute upper respiratory infections. I choose to call them acute spasmodic bronchitis. Unfortunately these patients are often diagnosed as asthmatics and are subjected to profound psychological reactions resulting from the serious attitude assumed by doctor and parents. The attacks are then more frequent and more prolonged until eventually they may suffer almost as much as a true asthmatic. The clearing up of foci of infection in tonsils, adenoids, and sinuses is of great benefit to this type of case.

DR. C. N. HENSEL (Saint Paul): This paper by Dr. Connor on sinusitis and asthma is difficult to discuss and yet very important to discuss. I would be glad if some of my confreres, members of the National Society for the Study of Allergy, whom I frequently meet at allergy meetings, could have heard this paper. They certainly need to accept the fact that the problem of asthma does not reside entirely in tissue sensitization and I feel sure that some of their failures would be eliminated if they would coöperate with a rhinologist in dealing with these cases. When, as occasionally happens at one of these meetings, a rhinologist presents a paper, they are loudly vocal in denouncing it, and I have heard the same intolerant attitude expressed by

the rhinologist over the efforts of the allergist to treat these cases without his aid.

Dr. Connor has wisely taken a middle ground and his pathological studies of nasal tissue have nicely shown the difference between the purely infectious type and the hyperplastic type associated with tissue sensitization. This latter type, he feels, should be thoroughly investigated by the allergist and the only surgery done in this type should be that to promote drainage.

While the pediatrician deals with the allergic patient in childhood, my approach and point of view lies largely with adults. I believe that individuals who manifest a sensitization in childhood, carry this tendency throughout life and I believe that we might do well, in taking our case histories, to inquire into the early feeding problems of the patient—as to the presence of hives, eczema, etc. A state of sensitization in an individual may remain latent and be precipitated into an active condition by some acute infectious process. The onset of asthmatic symptoms associated with an infectious process may cause the examining physician to believe that the condition is one of asthmatic bronchitis due to infection, whereas the facts may be that the infection has merely made active a latent tissue sensitization.

The skin tests may be looked upon as aids or clues in this differential diagnosis, and, using the positive skin tests as guides, and removing the individual from contact with offending allergens, should clear up a purely sensitization case. But frequently this happy result does not obtain; then I feel that it is necessary to resort to the services of an alert, competent rhinologist in order to see that there are no obstructions in the nose, spurs, or turbinate hypertrophies that may swell and reflexly produce spasm of the bronchioles, or an acute pyogenic condition in the nasal accessory sinuses. The finding and removing of these abnormal conditions has been of such great help to me in a sufficient number of asthmatic cases that have come to my consulting room, that I have become convinced that the problem of asthma is a double-header, in many instances, and needs the services of both the allergist and the rhinologist. Sheer vanity in either specialty should not prevent one or the other from sharing the credit that may come in relieving an asthmatic patient of his distress.

In attempting to explain the condition of the nasal tissues and the susceptibility to repeated "colds" in allergic patients, I have figured it out in this fashion. Just as in making the intradermal skin tests, a positive reaction produces swelling and irritation of the skin, so I believe that offending allergens circulating in the blood, may irritate the nasal mucous membranes and set up a boggy debilitated condition of the tissues which lowers their resistance to infections and makes a nice resting place where pathogenic bacteria may hibernate and start up fresh growth with any constitutional disturbance, such as the approach of menstruation, general bodily chilling, sitting in a draught, indigestion, constipation, etc. The nasal tissue in these individuals is never really free from infection. Let the offending allergens be removed from the patient's diet or environment, and let the rhinologist promote drainage through the necessary surgery, then the nasal mucous membrane will return to normal and the patient will be able to throw off this infection.

If this theory is true, then it is quite futile for the rhinologist to believe that he can cure his patients by nasal surgery alone, and it is equally futile for the allergist to expect to cure his cases without the aid of the rhinologist who can provide adequate drainage. I am, therefore, quite impressed with the honest, sane, central position that Dr. Connor has taken in this controversial subject. It is a point of view that looks toward the ultimate cure of the patient and I wish very much that Dr. Connor could present this paper before the American Society for the Study of Allergy.

DR. CONNOR (in closing): I do not mean to give the

impression that I think there is but little indication for nasal surgery in asthma; it is a type of therapy for which there is a definite field, a therapy which is to be exhibited only after careful study. The point I wish to make is that one cannot tell simply by looking in the nose whether or not surgery is necessary; it takes more than that. Each case must be carefully studied and surgery exhibited only in those in which there is a reasonable possibility of doing good. Such cases are not infrequent.

R. T. LA VAKE, M.D., *Secretary.*

WELCH'S CERTIFIED-PURE PASTEURIZED GRAPE JUICE NOT ACCEPTABLE

The Committee on Foods reports that the Welch Grape Juice Company of Westfield, N. Y., submitted a bottle of pasteurized grape juice, slightly sweetened with sucrose, called Welch's Certified-Pure Pasteurized Grape Juice. The advertising announced this grape juice as a discovery of modern science for weight reduction and the burning up of fat. This grape juice is no more effective for reducing weight than are many other common foods, nor does it "burn up fat." It has no value for building muscle or bone as claimed; it will not revive lost appetites, nor is it important for contributing Vitamin B for normal appetite. It is essentially a pleasingly flavored sugar solution, ranking with water for "facilitating elimination of waste products, aiding digestion, absorption, and reducing food putrefaction." The advertising is manifestly an artfully designed piece of deception to enmesh the credulous and those uninformed in nutrition and physiology. It is a revival of the blatant "patent medicine" and nostrum bluffs of the past. The company, when informed of the Committee's opinion, has not expressed willingness to change the advertising. This brand of grape juice, therefore, cannot be listed among the Committee's accepted foods. (*Jour. A. M. A.*, January 27, 1934, p. 292.)

BISODOL NOT ACCEPTABLE FOR N. N. R.

The Council on Pharmacy and Chemistry reports that BiSoDol (BiSoDol Company, New Haven, Conn.) is offered to physicians for use in "The Early Treatment of Colds" and in the treatment of "colds, rheumatism, cyclic vomiting and other conditions associated with an acidotic symptom." The Council on Pharmacy and Chemistry found BiSoDol unacceptable for New and Non-official Remedies because it is an unscientific mixture of indefinite composition, offered to physicians with extravagant and unwarranted therapeutic claims under a name which is not descriptive of its composition. The Council endorsed the conclusions of the Council on Dental Therapeutics of the American Dental Association (*J. Am. Dent. A.*, 19:1427 (August), 1932). According to this report, BiSoDol is stated on the principal container to offer "A rational and effective method of reestablishing the normal alkalinity of the body without danger of systemic disturbance"; no statement of composition other than "The presence of Malt Diastase and Carica Papaya Compound makes it valuable in digestive disturbances," appears on the container; and in the advertising issued to dentists, it is stated to be "composed of Sodium Bicarbonate and Magnesium Carbonate, Bismuth Subnitrate, the amolytic enzyme, Diastase, the proteolytic enzyme, Papain, and Oil of Peppermint." According to the chemist's report (of the Bureau of Chemistry of the American Dental Association), BiSoDol is essentially three parts of magnesium carbonate and four parts of baking soda to which a little oil of peppermint has been added. The amount of bismuth subnitrate in a single dose, approximately one-fifteenth of the average daily dose, is so small that for all practical purposes it might as well be omitted. (*Jour. A. M. A.*, October 29, 1932, p. 1511.)

LIST OF PHYSICIANS LICENSED BY THE MINNESOTA STATE BOARD OF MEDICAL EXAMINERS ON FEBRUARY 10, 1934

(January Examination)

NAME	SCHOOL OF GRADUATION	ADDRESS
Andrus, Frank Clinton.....	U. of Minn., M.B., 1932; M.D., 1933.....	Mpls. Gen. Hosp., Minneapolis, Minn.
Boehme, Earl J.....	U. of Minn., M.B., 1932; M.D., 1933.....	455 Herschel Ave., St. Paul, Minn.
Bossingham, Earl Nathaniel.....	U. of Minn., M.B., 1933.....	St. Mary's Hosp., Duluth, Minn.
Carow, Theodore Moffett.....	U. of Ill. M.D., 1932.....	Mayo Clinic, Rochester, Minn.
Dodds, George Alfred.....	U. of Ore., M.D., 1932.....	Glen Lake San., Oak Terrace, Minn.
Engdahl, Frederick William.....	U. of Minn., M.B., 1933.....	St. Mary's Hosp., Duluth, Minn.
Ericsson, Martin Gust.....	U. of Minn., M.B., 1933.....	St. Mary's Hosp., Minneapolis, Minn.
Flom, Martin Gerhard.....	Indiana U., M.D., 1933.....	Fairview Hosp., Minneapolis, Minn.
Guthrie, John Somerville.....	Queen's U., M.D., 1927.....	Mayo Clinic, Rochester, Minn.
Hayden, Ralph O.....	U. of Minn., M.B., 1933.....	Mpls. Gen. Hosp., Minneapolis, Minn.
Hodgson, Corrin Haley.....	U. of Minn., M.B., 1931; M.D., 1932.....	Fergus Falls, Minn.
Kennedy, George Lawrence.....	McGill U., M.D., 1932.....	2824 Humboldt Av. S., Minneapolis, Minn.
Knoepp, Louis Frederick.....	U. of Mich., M.D., 1931.....	Mayo Clinic, Rochester, Minn.
Kulzer, Norbert John.....	U. of Minn., M.B., 1933.....	St. Mary's Hosp., Minneapolis, Minn.
Montgomery, Lall Greenway.....	U. of Manitoba, M.D., 1929.....	Mayo Clinic, Rochester, Minn.
Olmanson, Edmund Goodwin.....	Northwestern U., M.B., 1933.....	St. Peter, Minn.
Plunkett, John Elmer.....	Queen's U., M.D., 1930.....	Mayo Clinic, Rochester, Minn.
Pugmire, Adrian Smuin.....	Northwestern U., M.B., 1933.....	941 S. 11th St. E., Salt Lake City, Utah.
Schwinghamer, Elmer James.....	Washington U., M.D., 1932.....	668 Central Pk. Place, St. Paul, Minn.
Silver, John David.....	U. of Minn., M.B., 1932; M.D., 1933.....	1201 9th St. S., Minneapolis, Minn.
Sloan, Julius.....	U. of Minn., M.B., 1933.....	1715 8th Ave. N., Minneapolis, Minn.
Smith, Thorsten.....	U. of Minn., M.B., 1933.....	Ancker Hospital, St. Paul, Minn.
Stein, Kenneth Edward.....	U. of Minn., M.B., 1932; M.D., 1933.....	St. Mary's Hosp., Duluth, Minn.
Strohl, Everett Lee.....	U. of Ill., M.D., 1932.....	Mayo Clinic, Rochester, Minn.
White, Asher Abbott.....	U. of Minn., M.B., 1929; M.D., 1930.....	424 Walnut St. S. E., Minneapolis, Minn.
Whitesell, Lloyd Ashley.....	U. of Minn., M.B., 1932; M.D., 1933.....	1400 Portland Ave. S., Minneapolis, Minn.
Whittaker, Lorin Dixon.....	U. of Ill., M.D., 1933.....	Mayo Clinic, Rochester, Minn.

BY RECIPROCITY

Cook, Carroll Kenneth.....	U. of Mich., M.D., 1925.....	896 Payne Ave., St. Paul, Minn.
Moran, Tressa Rose.....	Loyola U., M.D., 1921.....	St. Luke's Hosp., St. Paul, Minn.
Ryan, James LaVerne.....	Marquette U., M.D., 1932.....	Sleepy Eye, Minn.

THE TOXICITY OF DINITROPHENOL

It has been shown that dinitrophenol enormously accelerates cellular metabolism, and it has been proposed that the substance be used clinically in the treatment of conditions in which acceleration of the metabolic rate may be of value. The Council on Pharmacy and Chemistry in its preliminary report emphasized, however, the limitations to and the possible dangers from the clinical use of this drug and urged that it be used only under strictly controlled conditions. The Journal added editorial emphasis to the same point. Reed and Emerson of San Francisco report on the toxicity of dinitrophenol, and they, too, stress the dangers inseparable from its use. It is significant that these authors conclude that it is yet to be demonstrated that dinitrophenol is as safe and satisfactory for weight reduction in human beings as other methods in common use. It is to be expected that, with the craze that has in the past few years affected the American public, and especially the feminine contingent thereof, for short-cuts to the sylph figure, proprietary products will begin to appear having for their essential drug dinitrophenol. One is already on the market, put out by the R. R. Rogers Chemical Company of San Francisco under the name "Nox-Ben-ol." This preparation is advertised both to physicians and to the public. According to advertising matter on Nox-Ben-ol, it is a "Magnesia Nitroxybenzol product and is sold in packages of 120 3-grain capsules (33-day treatment) through your physician and the drug trade." It appears, too, that the stuff is also being advertised over the radio. The dangerous possibilities of such exploitation should be obvious. (Jour. A. M. A., September 30, 1933, p. 1080.)

SOME EFFECTS OF OVERDOSAGE WITH VIOSTEROL

Not long after the introduction of viosterol, tests made on experimental animals with large doses demonstrated that under certain conditions it can give rise to harm. Before long, however, it was learned that the range between therapeutic and toxic doses is large, so that the danger of overdosage now seems rather remote. Only when the intake of viosterol solutions exceeds the established medicinal dose a thousand times, or by some excess of that approximate magnitude, do the symptoms of disorder clearly manifest themselves. Medicine should welcome every new study of viosterol particularly in view of the increasing tendency to fortify many common foods, such as milk and bread, with vitamin D. In recent studies by Reed and his co-worker at the University of Illinois College of Medicine, a significant increase in the resting, postabsorptive metabolic rate in animals has been observed following administration of large doses of viosterol. This stimulation of the metabolic rate has been difficult to explain, as it has not yet been quantitatively related to any other observed factor. Hypercalcification has been observed by many investigators. Recent researches indicate that the magnitude of the increase in calcium content is not correlated with the dosage but seems to depend on some undetermined individual factors. It was found that the phosphorus content, while widely variable among individual animals, was affected by the administration of viosterol in a much less constant manner, if at all. According to these studies the significance of deposition of calcium in the tissues cannot be evaluated at present. (Jour. A. M. A., August 26, 1933, p. 714.)

BOOK REVIEWS

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THE 1933 YEAR BOOK OF GENERAL MEDICINE.

By Various Writers. 831 pages. Illus. Price, \$3.00. Chicago: The Year Book Publishers, 1933.

Out of the abundant literature of 1933 the Year Book has selected much of interest, and has chosen as editors of the various sections men whose names are widely known as foremost investigators of and writers upon the diseases with which each section deals.

In describing infectious diseases, which constitute the first section, who is so fitted to write about this subject as George F. Dick, who in conjunction with Gladys Dick has made famous contributions to the knowledge of scarlet fever? The editor of the section thinks the most important advance to be the successful growth of variola vaccine in pure tissue culture, doing away with all possibility of contamination. It will be a great step indeed if it should prove to abolish the danger of post vaccinal encephalitis, the occurrence of which, though rare, is highly disconcerting, and likely to furnish a weapon for antivaccinationists.

While attention is called to the importance of bacillary dysentery and it is suggested that many cases of it have been given the popular name "intestinal flu," no mention is made of the ameba, doubtless due to the fact that the articles quoted on dysentery were written in March. Next year's book will be sure to have much to say about the Century of Progress epidemic.

Noteworthy points in this section are that the mortality for measles at all ages is six per cent, that the serum treatment of poliomyelitis does not give very

encouraging results, that the use of the Drinker apparatus must be continued until the patient is able to cough, and that Schmitt, writing of common colds, says that they are due to exposure. What has Dr. Brady to say to that?

The fact that Minot edits the part devoted to diseases of the blood directs attention to what is said about pernicious anemia. The intramuscular injection of liver extract gives about thirty times the effect of feeding the whole liver by mouth, and as far as present indications go treatment must be kept up indefinitely, for the Minot-Murphy treatment is not yet eight years old, and the length of life was longer than that sometimes in cases that came before the liver era.

Disease of the kidney also are included in this section, and the contributors show an increased tendency to encourage a higher protein diet than used to be advocated, making the point that the general nutrition of the patient must be kept prominently in mind. Forty years ago a well known man gave nephritis patients a diet with an overwhelming proportion of meat, but his methods were too revolutionary and had but little following.

Diseases of the heart and blood vessels are supervised by William D. Stroud. Why is the name "rheumatic" heart disease retained? Rheumatism means nothing definite, and the cases to which it is applied are surely infections.

It is pointed out that the ratio of deaths from heart disease to population has more than doubled during the last thirty years. In many parts of the country, at least, it shows by far the highest mortality of any of the diseases, outranking cancer, which is the next in order. Although pulmonary tuberculosis has a large mortality still, and is the leading cause of death between the ages of twenty and forty, it has dropped in New York state from first place which it held in 1900 to sixth place in 1929, while during the same period heart disease has risen from fourth to first place. Incidentally it may be worth while to call attention to the little noticed fact that cerebral hemorrhage now occupies fourth place in this part of Minnesota, only heart disease, cancer, and pneumonia having a higher death rate.

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CINCHOPHEN POISONING*

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CINCHOPHEN and its derivatives are the most common causes of toxic hepatic cirrhosis in the experience of physicians at The Mayo Clinic. Numerous patients with arthritis, myositis, or neuritis have recourse to cinchophen on the advice of their physicians or to patent remedies containing the drug. Moreover, the number of preparations and derivatives of cinchophen is increasing each year. Hench has listed more than thirty such preparations, and has said that the active principle of many of the patent rheumatic remedies on the market is cinchophen. Atophan (cinchophen) and oxyliodide have the greatest vogue of all the preparations. Biloptin (diiodo-atophan) icterosan; neocinchophen; atoquinol (allyl phenylcinchoninicester); atophanyl (cinchophen sodium, sodium salicylate, and procaine hydrochloride); quinophan; farastan (mono-iodo-cinchophen); Harrell's, Van Ard's, Cahill's and Cass' preparations; Gorum cachets, and Renton's hydrocine tablets are among others that are well known. Of the twenty-five patients seen at the clinic, ten had used cinchophen or atophan; seven, oxyliodide; four, Renton's hydrocine tablets, one Cass' rheumatism treatment, one Cahill's rheumatism remedy, and two an unknown but patent rheumatism remedy. Many remedies are used freely, without medical supervision.

Poisoning from cinchophen was not recognized until fourteen years after Nicolaier and Dohrn introduced the drug as an agent in the treatment of gout. In 1922, Schroeder described cutaneous symptoms. The next year occurred

Worster-Drought's case, the first of hepatic injury and jaundice. Cabot and Cabot's case, in 1925, served to focus the attention of interested observers on this subject. Since that time increasing numbers of cases with cutaneous, anaphylactoid, gastro-intestinal, or hepatic symptoms of cinchophen poisoning have been recorded. Cases of hepatic injury have been most frequently reported. Earlier this year Weir and I reviewed ninety-eight such cases reported by physicians other than those of The Mayo Clinic, and nineteen cases observed at the clinic. Of these 117 patients, sixty-one died.

Such statistics are impressive evidence, not only of the actuality of the poisonous qualities of the drug cinchophen, but also of the high mortality rate in cinchophen hepatitis. Nor does the number reported by any means represent all the cases. Unquestionably many are unrecognized and many more are not reported. The mortality rate of approximately 50 per cent is perhaps too high. Wider recognition of the milder and non-fatal cases now confused with epidemic jaundice and cholecystitis undoubtedly will reduce the rate to a lower but still formidable figure. In the series reported by Weir and me the mortality rate was approximately 25 per cent.

Fortunately only a small percentage of the patients who use cinchophen are poisoned. Unfortunately physicians are unable to anticipate untoward results. In some cases, alcoholism, eclampsia, cholecystitis, hepatitis, cirrhosis or under-nutrition are possible predisposing factors, and in such conditions use of the drug is contraindicated. Undoubtedly certain persons have an unexplained idiosyncrasy to the drug. Break-

*From the Division of Medicine, The Mayo Clinic, Rochester, Minnesota. Read before the Southern Minnesota Medical Association, New Ulm, September 25, 1933.

ing of the benzene nucleus, formation of nitro-compounds from the quinoline nucleus, and impurity of the drug are advanced as explanations of its toxic effects. Chemists may find some way to detoxify the drug, but years and much research will be required to prove the value of the change in formula. In the meantime, certain precautions should be taken. The following cases are presented to illustrate the danger signs in treatment with cinchophen and the measures, prophylactic and curative, which, judging from experience at the clinic, will reduce the incidence of, and the mortality from, cinchophen poisoning.

Report of Cases

Case 1.—A man, aged fifty-four years, registered at The Mayo Clinic December 5, 1932, with a complaint of jaundice of forty days' duration. About September 1 the patient began to use three capsules of oxyliodide daily for arthritic pain. This medication was continued until October 20 over periods of ten days with intervals of the same duration. September 10 an attack of nausea, vomiting, and diarrhea occurred. October 15 an urticarial rash appeared and lasted for two days. October 23 there was another attack of nausea and malaise, and October 25 jaundice appeared and reached its maximal intensity within a few days. A cholecystogram gave evidence of a nonfunctioning gallbladder, and the patient was advised elsewhere to have this organ removed. The jaundice had been clearing for the last two weeks.

The slight grade of jaundice, and the enlarged, tender liver (edge 5 cm. below the costal margin) were the only positive physical findings. The bromsulphalein test of hepatic function revealed retention of dye graded 2. The concentration of bilirubin was 1.6 mg. in each 100 c.c. of serum. The van den Bergh reaction was direct. A cholecystogram gave evidence of a normally functioning gallbladder. The diagnosis was toxic cirrhosis caused by oxyliodide. The patient was advised to follow a diet high in carbohydrates and to avoid cinchophen or any of its derivatives.

Most commonly, the pre-icteric symptoms of toxicity are weakness, and gastro-intestinal or cutaneous manifestations. In addition to the nausea, vomiting, and diarrhea that were observed in Case 1, anorexia, heartburn, and belching often precede the appearance of jaundice. Likewise pruritus, as well as urticaria, is an especially clear-cut warning of danger ahead. If in this case administration of the drug had been discontinued at the onset of the first episode of nausea and vomiting, the patient would have been spared his harrowing experience. All similar symptoms should be considered an indication for discontinuing administration of the drug. It

seems fair to the public that the drug should be used only when ordered by a physician, and that its use should be forbidden to makers of patent medicines and its sale without prescription be prohibited.

Although by this precaution many cases of cinchophen poisoning would be avoided, some would not. Often toxic cirrhosis and jaundice may appear without premonitory symptoms. It may appear after very small doses, after long periods of medication, and even at times weeks after the drug has been used. Again, the premonitory symptoms may be of brief duration and may be rapidly followed by the appearance of jaundice. Consequently, while occupying a warranted position in treatment, as an extra safeguard to the patient, cinchophen should be used only when other drugs have failed to relieve chronic pain.

In Case 1, the finding indicative of nonfunctioning gallbladder, obtained before the patient came to the clinic, as well as the jaundice, led the physician at the patient's home to advise cholecystectomy. Actually, a finding indicative of a nonfunctioning gallbladder, in the presence of jaundice, is of little diagnostic aid. A finding indicative of a nonfunctioning gallbladder is the rule if intrahepatic jaundice is present even when the gallbladder is not diseased. A result indicative of a normally functioning gallbladder may sometimes be obtained even if slight jaundice is present. Such a finding may be taken to indicate that the gallbladder is incapable of playing an important part in the genesis of resolving jaundice.

Operation during the acute phase of the toxic cirrhosis is attended by a very high mortality rate. Of the patients in the cases reported, ten have been operated on and eight have died. A fatal outcome followed merely tonsillectomy in one of Rabinowitz' cases. Had cholecystectomy been performed when advised at the height of the jaundice in Case 1 the patient would have had small chance of living to tell the tale.

Case 2.—A man, aged sixty-six years, registered at The Mayo Clinic July 6, 1932. Atophan or cinchophen had been taken intermittently during the last five years, and had greatly relieved a chronic ache in the lumbar region.

The edge of the liver was palpable 6 cm. below the costal margin and the movements of the spine were limited. The concentration of serum bilirubin was normal and the van den Bergh reaction was indirect. The bromsulphalein test of hepatic function revealed reten-

tion of dye graded 3. Roentgenologic examinations of the spinal column revealed hypertrophic changes in the lumbar portion. The diagnosis was toxic cirrhosis caused by cinchophen, and hypertrophic arthritis. The patient was advised not to use cinchophen. November 16, 1932, the liver was smaller, and its edge soft. The retention of dye had diminished to Grade 1.

The fact is little appreciated that hepatic injury from cinchophen occurs in the absence of clinical jaundice. In Case 2 the value for serum bilirubin was normal, and the van den Bergh reaction was indirect. On the contrary, in a case similar to Case 2 the concentration of bilirubin was found to be 2.3 mg. in each 100 c.c. of serum, and the van den Bergh reaction was direct. Ross and Klinkert have reported similar cases of hepatic injury without jaundice. Such findings suggest that definite hepatic injury may accompany or precede the appearance of the cutaneous, gastric, or other pre-icteric symptoms, and that hepatolysis may be the immediate cause of such symptoms. Bromsulphalein tests of hepatic function, elevated values for serum bilirubin, direct van den Bergh reactions, or tenderness, as well as hepatic enlargement, as in this case, should warn of approaching danger in similar cases.

The physician will be able to avoid many cases of cinchophen poisoning if he maintains the proper awareness of danger, and if he is familiar with the early signs and symptoms.

Case 3.—A man, aged sixty-four years, came to The Mayo Clinic May 24, 1932. Six weeks before his admission he had begun taking Cass' preparation, for muscular pain. It was estimated that he had not taken more than 55 gm. of cinchophen. May 5, the urine was darker than usual, and he vomited occasionally. May 12, the skin was definitely yellow, and thereafter the degree of jaundice increased rapidly. He slept most of the time and lost 20 pounds.

The patient was stuporous and weak; the jaundice was intense; the liver and spleen could not be palpated. The concentration of bilirubin was 25 mg. in each 100 c.c. of serum and the van den Bergh reaction was direct. The galactose tolerance test revealed 5.1 gm. of reducing substance in the urine. Duodenal drainage secured at first a large amount of bile-stained fluid; later, amber bile. On a diet high in carbohydrates, and with daily intravenous injection of 10 per cent glucose, the patient's condition began to improve June 4. The diagnosis was toxic cirrhosis caused by cinchophen.

August 31, four months after the onset of jaundice, the condition of the patient was excellent, the liver was barely palpable, the concentration of serum bilirubin was normal, the van den Bergh reaction was indirect, the retention of dye was graded 2, and the gallbladder

was functioning normally as revealed by cholecystographic examination.

The painless onset of the jaundice, the stupor, weakness, anorexia, nausea, plateau-like level of the value for serum bilirubin until improvement begins, pruritus, and palpability of the liver are characteristic of the more severe cases. The onset may, however, be painful, and chills and fever may be associated symptoms.

The diagnosis must depend on the history of use of the drug. Nonobstructed ducts and a direct van den Bergh reaction are two findings essential to the establishment of the intrahepatic character of the jaundice. The fatal cases of toxic cirrhosis due to cinchophen are indistinguishable from acute or subacute yellow atrophy resulting from other poisons. The nonfatal cases are indistinguishable from the ordinary cases of catarrhal jaundice or intrahepatic jaundice from other causes. When medicine has been taken to alleviate pain prior to the onset of jaundice, the suspicion should be entertained that the medicine was cinchophen. The diagnosis is important, for the patient must be warned against further use of the drug. The prognosis is serious in every case, and correct differential diagnosis from diseases of the gallbladder, bile ducts, or portal cirrhosis is important to guard against the dangers of operation.

The prognosis becomes more guarded if deep jaundice persists, if anorexia is troublesome, and if headache, drowsiness, and restlessness occur. Such symptoms are the forerunners of stupor, coma, delirium, and convulsions, themselves the precursors of death, and call for intensive treatment. Gross hemorrhage from esophageal veins, and ascites, are terminal phenomena in a fair proportion of cases.

The treatment is fairly well defined. A diet rich in carbohydrates is prescribed. The patient is encouraged to supplement this with candy, and a supply of Karo syrup and a loaf of bread are placed within reach. A patient who can be persuaded to eat seldom dies. Glucose, 10 per cent, and sodium lactate, 2 per cent, injected intravenously, daily, in quantities of 1,000 to 3,000 c.c. have definitely reversed the downward trend of the patient's condition on more than one occasion. Duodenal drainage, when the patient's condition permits, is important. Insulin has been thought by some physicians to increase the effi-

ciency of glucose. Bassler advocated liver extract. Diathermy is said to be of value.

In the nonfatal cases the jaundice usually begins to clear within three weeks, and recovery is usually fairly complete in eight weeks. On the contrary, in the fatal cases, about half of the patients are dead within two weeks, and three-fourths in four weeks. Startlingly enough, a degree of hepatic injury measurable by the bromsulphalein test may persist, as in Case 3, for months.

The changes observed in the fatal cases explain the seriousness of the prognosis. They are acute or subacute atrophy or toxic cirrhosis. The liver has weighed as little as 450 gm. (normal 1,600 gm.). Microscopically, relatively rapid and extensive necrosis and autolysis of the hepatic parenchyma, relative increase of connective tissue secondary to loss of parenchymal tissue, slight if any proliferation of the connective tissue in the acute stages, and beginning regeneration in the more chronic stages, may be seen. From the small, reformed masses of hepatic parenchyma may be visualized the nodular regeneration of the restored liver. Beaver and Robertson have pointed out the distinctive character of the pathogenesis.

Summary and Conclusions

The case against cinchophen is seemingly complete, and its record apparently becomes blacker the more it is studied. Another side of the case, however, may be presented. Its value as a drug to alleviate pain and suffering, as well as its influence on purine metabolism in gout, has been established. Great quantities of the drug have been used in an incalculable number of cases with beneficial results. Actually, the incidence of poisoning must be small. Shall the majority of patients be denied its effects in order to protect the few? It is true that a poisoned patient or bereaved relatives scarcely will be able to forgive its use.

Hench has pointed out a practical middle ground. The use of the drug, with full knowledge of its occasional untoward reaction, and its

use only after other remedies have been tried unsuccessfully, seems to him the logical position in solving this trying problem. Analysis of the available information and experience at the clinic leads me to believe, further, that the incidence of the mortality from cinchophen poisoning can be further reduced by its use only under the direction of the physician, who, familiar with the symptoms, especially of the pre-icteric stage, will arrive at an early and correct diagnosis, to the end that administration of the drug be stopped, the patient warned against its further use, surgical intervention avoided, and early and appropriate treatment instituted. Such precautions would preclude also the use of cinchophen by makers of patent medicines and its sale without a physician's prescription.

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TUMORS OF THE BRAIN FROM THE SURGICAL STANDPOINT*

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TUMORS of the brain usually cause symptoms associated with defects in vision or contour of the skull, and motor and sensory disturbances of so definite a nature that a diagnosis is possible. However, following an exhaustive examination, the nature and situation of the lesion may be so obscure that further methods of investigation, consisting of injection of air into the ventricles, or into the subarachnoid space, may be necessary to complete a diagnosis. In the presence of papilledema signifying increased intracranial pressure, it is customary to aspirate the cerebrospinal fluid from the ventricles and to replace it with air through trephine openings over the posterior horn of the lateral ventricle. When there is no evidence of increased intracranial pressure, fluid is aspirated from the subarachnoid space and air is injected by means of the ordinary spinal puncture method. The former is called ventriculography and the latter encephalography. Following the injection of air, roentgenograms of the head enable visualization of the ventricles and subarachnoid spaces of the brain, thus providing a means of distinguishing between tumors of the brain and other intracranial lesions, or of aiding in the localization of tumors. Any distortion of the ventricles indicates a lesion of the cerebral hemispheres, and a symmetrical enlargement of the ventricles indicates a lesion of the third or fourth ventricle or of the cerebellum. The value of ventriculography in making a diagnosis is well illustrated in the following case:

Case 1.—A man, aged thirty-one years, came to The Mayo Clinic complaining of headache, convulsions, and dimness of vision. Four years previously, without any warning, he suddenly had a generalized convulsion. One year later he had another, and in the succeeding two years he had three attacks of momentary loss of memory and speech. Three years later, or one year before examination, he began having occipital headaches and about the same time noticed blurring of vision. Thorough examination was negative except for the presence of bilateral choked disks, indicating in-

creased intracranial pressure. From the history and examination, it was evident that he was probably suffering from a tumor of the brain, and the only localizing symptom consisted of the history of attacks of aphasia which suggested a left frontal lesion. Ventriculography was carried out and the roentgenograms of the head revealed distortion of the ventricles, which localized the lesion in the left parieto-occipital region. At operation, a large meningioma, measuring 7 by 6 by 3 cm. was removed.

Once the diagnosis has been established and localization has been determined, the surgical approach must be planned to allow for wide exposure of the underlying brain. When the lesion involves the frontal, temporal, parietal, or occipital lobes, an osteoplastic flap is usually reflected in such a manner as to expose the portion of the brain involved. The dura should be carefully examined for evidence of superficial tumors and then incised and reflected to examine the convolutions of the brain. Tumors which occur on or near the surface are usually capable of being enucleated. When tumors are not apparent on the surface but are indicated by broad and flat convolutions, an exploring trocar can ascertain their depth and consistence previous to any attempt at removal. With the aid of the electrosurgical unit, incision can be made in the cortex to expose further and to aid in removal.

The most common tumors of the brain are those which arise from the glial substance and are designated gliomas. Until recent years these tumors were considered universally malignant, in that they infiltrated the surrounding brain and tended to recur rapidly. One of the recent contributions to surgery of the brain has been division of the gliomas into different grades of malignancy. The relative malignancy of these tumors influences the surgical procedures employed, because the less malignant types are sometimes capable of complete removal. Complete removal of one of the comparatively less malignant gliomas can be illustrated in a case recently encountered:

Case 2.—A man, aged fifty-two years, gave a four and a half years' history of generalized convulsions,

*From the Division of Surgery, The Mayo Clinic, Rochester, Minnesota. Read at meeting of Southern Minnesota Medical Association, New Ulm, Minnesota, September 25, 1933.

preceded by twitchings of the fingers of the right hand, and muscular contractions of the right side of the body. These attacks had been controlled by administration of phenobarbital until four months preceding his registration, when they began to occur every hour, and were followed by transient aphasia. Examination gave essentially negative results, except for weakness of the right side of the body and complete aphasia. In the absence of increased intracranial pressure, but with the localizing signs indicating involvement of the left frontal lobe, an osteoplastic flap was reflected in this region. A large, infiltrating, vascular tumor was found involving the left frontal and parietal convolutions, and by gentle dissection with the aid of the electrosurgical unit, the entire tumor was removed. Microscopic examination of the tumor revealed that it was an astrocytoma, or one of the less malignant types of glioma.

In addition to the difference in malignancy of tumors of the glioma group, there is often a tendency for these lesions to become cystic, due to the degeneration from within, and at operation only a small nodule of tumor can be found. An example of this is the following case:

Case 3.—A child, aged five years, was brought to the clinic with a history of being well until six weeks before, when she stumbled and fell while going downstairs. There was no evidence of injury, but following this accident she limped with her left leg. Three weeks later she complained of having a right temporal headache in the mornings, which lasted a short time and was not accompanied by vomiting. Ocular examination disclosed a bilateral choked disk, measuring 2 to 3 diopters, and neurologic examination revealed weakness of the left side of the face and body. A diagnosis was made of a tumor involving the right parietal lobe. An osteoplastic flap was reflected and a subcortical cystic tumor, containing 4 ounces (120 c.c.) of yellow fluid was encountered in the postparietal area. The cyst was opened with the electrosurgical unit and a small nodule of tumor was found on the mesial wall. This was completely removed, and proved to be an oligodendroglioma of comparatively low degree of malignancy. The child has remained completely well, with no signs of recurrence for six years.

Another prevalent group of tumors of the brain are those arising from the meninges, the so-called meningiomas. They do not invade the brain but produce symptoms by compression. Frequently they are associated with hyperplasia of the adjacent part of the skull, which is indicated in the roentgenogram of the head. It is for this reason that lateral and anteroposterior roentgenograms of the skull are necessary for the examination of all patients suspected of having a tumor of the brain. Quite frequently the presence of an osteoma of the skull is of incalculable

value in localizing a tumor of the brain. This fact is illustrated in the following case:

Case 4.—A man, aged fifty-seven years, gave a history of having had attacks of jacksonian seizures involving the left hand and arm, followed by loss of consciousness. These attacks had been increasing in frequency and severity over a period of six months. Physical and neurologic examinations were essentially negative except for some weakness of the left hand and arm. Roentgenologic examination of the skull disclosed an osteoma over the right parietal lobe, which easily could be palpated through the scalp. An osteoplastic flap was reflected over this area, which included the osteoma, and a large meningioma, measuring 5 by 4 by 3 cm., was found attached to the underside of the dura and was completely removed. Meningiomas are not malignant, but tend to recur if the overlying bone is not removed. Therefore, before replacing the osteoplastic flap, all the bone involved in the osteoma was resected. It has been three years since this tumor was removed, and the patient is completely well and has had no further attacks.

Many times tumors originating from the meninges are attached to the longitudinal sinus, and their removal is complicated by the necessity of resecting the sinus. Whenever the tumor is placed in the anterior position this removal can be accomplished with safety.

Occasionally tumors of the brain are encountered which neither arise from the brain itself nor from the meninges, although they may lie within the brain substance. The symptoms may be those of either a glioma or meningioma, and a differential diagnosis is made at the operating table, on evidence elicited, or on examination. The following case is illustrative:

Case 5.—A boy, aged thirteen years, was brought to the clinic because of generalized convulsions. At the age of three years he fell downstairs, and one month later, after a mild, generalized convulsion, he was unable to talk for six hours. This was followed at frequent intervals by generalized convulsions, with residual weakness of the left arm, for a period of one year. He had no further attacks until he was twelve years old, when they recurred and were preceded by jacksonian attacks involving the right hand and arm. Roentgenograms of the head disclosed a large, calcified tumor in the left frontal lobe, and neurologic examination revealed moderate weakness of the right upper extremity. Through a large osteoplastic flap in the left frontoparietal region, the calcified tumor was removed; it was found to measure 7 by 8 cm. and weighed 250 gm. This was probably an old, calcified hematoma. The boy recovered sufficiently to return home and to finish high school with no further attacks.

Probably one of the most interesting groups of tumors of the brain are those which occur

about the optic chiasm and sella turcica. The most common tumor is probably the pituitary adenoma. These tumors, as a rule, do not cause increased intracranial pressure, but their symptoms are due either to pressure on the optic chiasm or nerves or to pituitary dysfunction. The pressure on the optic chiasm or nerves results in visual difficulties which can be mapped out on perimetric fields and which usually consist of hemianopsia. The endocrine disturbance may be due to hyperfunction of the gland, producing enlargement of the bones of the head, hands, and feet after adolescence, or gigantism, during the years of development. Hypofunction of the gland is evidenced by amenorrhea, lowered blood pressure, listlessness, lowered basal metabolic rate, and absence of hair from the body.

The most common syndrome of pituitary tumor which fortunately responds most satisfactorily to surgical interference is well illustrated by the following case:

Case 6.—A woman, aged twenty-six years, came to the clinic complaining of loss of vision which had come on rather gradually during the preceding six months. She had not menstruated for two years previous to her examination. Physical and neurologic examinations were essentially negative except for a lowered basal metabolic rate. Examination of the eyes revealed bitemporal hemianopsia for form and colors. Right, transfrontal exploration was made, and a large pituitary tumor was removed with little difficulty. Following an uneventful convalescence, the patient was allowed to leave the hospital on the twelfth postoperative day, when examination of the perimetric fields revealed a complete return to normal. She began to menstruate six months following operation.

The case just reported illustrates the advantage of early diagnosis and operation when the symptoms of pituitary tumor consist of failing vision and pituitary dysfunction.

Occasionally tumor of the brain produces symptoms of such severity that treatment of any form seems hopeless, but in spite of the most discouraging prognosis, operation should be attempted because frequently the underlying tumor can be removed with complete remission of symptoms. Following is an illustrative case:

Case 7.—A man, aged thirty-one years, was brought to the clinic, complaining of headaches, loss of vision, and unsteady gait, for which hospitalization had been required. He was found to have increased intracranial pressure as indicated by a choked disk of 4 diopters. Nystagmus, incoördination and ataxia caused the situation of the tumor to be identified as the posterior fossa.

The patient was taken to the operating room, and before anything could be done, respiration ceased. Artificial respiration was started, an intratracheal tube was quickly inserted, and mechanical artificial respiration was carried out by means of a machine constructed for this purpose. Aspiration of the lateral ventricles did not allow for voluntary respiration and it was not until suboccipital decompression had been done and the dura opened, that the patient began to breathe voluntarily. When the cerebellum had been exposed, a large, cystic tumor was found in the right lobe, from which 40 c.c. of yellowish fluid was removed. When the cyst was opened, a small nodule of tumor was removed which proved to be an astrocytoma or glioma of a low grade of malignancy. Although only eight months have elapsed since this operation, the patient is working every day and apparently is perfectly well.

Tumors in the posterior fossa invariably produce increased intracranial pressure and may be simulated by an inflammatory cystic condition. A differential diagnosis is possible only at the time of operation, as in the following case:

Case 8.—A girl, aged nine years, complained of headaches, vomiting, and failing vision. She had had a severe cold, bronchitis, and persistent cough six months previously, which had been associated with sudden attacks of severe frontal headache and projectile vomiting. She had been confined to bed for three weeks, and when examined, was found to be very frail and emaciated. Roentgenologic examination of the head revealed increased intracranial pressure, and of the thorax, pulmonary abscess or primary malignancy. Examination of the eyes revealed bilateral choked disks of 3 to 4 diopters, and neurologic examination elicited a bilateral Babinski sign, marked ataxia, and incoördination. A bronchoscopic examination was made and the mass seen on roentgenologic examination proved to be inflammatory. In spite of the increased intracranial pressure, the girl was kept under observation for two weeks in an effort to improve the pulmonary condition. She was evidently suffering from a cerebellar lesion, and because ether anesthesia was contra-indicated, a suboccipital exploration was carried out with the patient under the influence of nembutal, avertin, and local anesthesia. Instead of finding a tumor of the brain, multilocular inflammatory cysts of the arachnoid were exposed and removed. They were evidently secondary to the inflammatory process in the lungs. Following operation recovery was uneventful and the lesion has not recurred over a period of years.

These illustrative cases tend to lay emphasis on operable tumors of the brain, and more or less to ignore the tumors which prove inoperable. It is true that some of the more malignant and rapidly growing tumors cannot be removed surgically, and palliative decompression, with roentgen therapy, must be resorted to, but these lesions are worthy of surgical consideration because in some

cases the palliative relief extends over a period of years and allows the patient to return to work and family for an indefinite period. In a recent survey of all tumors of the brain, it was found that only about 40 per cent were gliomas, 14 per cent were pituitary adenomas, and another 18 per cent were meningiomas. From these figures, it is evident that the tumors of the glioma group seem to predominate, and if all the gliomas were equally malignant, the outlook would indeed be discouraging. However, in carrying the survey a little further, and attempting to grade the malignancy of the glioma group, it was found that the so-called spongioblastoma multiforme and the medulloblastoma, which correspond to a carcinoma graded 4 elsewhere in the body, comprised only 41 per cent of the entire group. Another 11 per cent of the remaining types of glioma were graded from 1 to 2 and another 45 per cent could be graded 1. Five-year cures were reported when the gliomas were found to be of lower grades of malignancy.

Conclusions

Tumors of the brain present varied symptoms,

consisting of headaches, projectile vomiting, failing vision, motor and sensory disturbances, ataxia, and incoördination. Increased intracranial pressure may be present with or without definite localizing signs. The surgical diagnostic methods of encephalography or ventriculography may be used subsequent to complete general and neurologic examinations, including ophthalmologic examination and roentgenologic examination of the skull. More gratifying surgical results can be directly attributed to improved surgical technic and earlier diagnosis. Tumors of the brain may be simulated by inflammatory and traumatic lesions which can be identified only at the time of operation. The predominance of the gliomas should not indicate a too pessimistic outlook, as a recent classification of these tumors demonstrates a difference in degree of malignancy with a more hopeful outlook for the majority of tumors of this group.

A definite pathologic diagnosis can be established only at the operating table, and the prognosis depends on the situation, size, and nature of the tumor found at operation.

DEVELOPMENT OF THE HUMAN CHEST*

SIMILARITY BETWEEN NORMAL INFANTILE AND ADULT TUBERCULOUS CHESTS

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IN PREVIOUS reports^{19,20,21} it was emphasized that the tuberculous chest is not flat, as has been the general belief, but is rather deep, narrow, and more rounded (Fig. 1). It is the healthy chest that is flat. The tuberculous chest showed a larger thoracic index by 10 to 15 per cent. By thoracic index is meant the ratio of the depth of the chest to the width. It was also concluded that the tuberculous chest was undeveloped, primitive, and deep, and was more prone to pulmonary tuberculosis.

In order to prove that the tuberculous chest was a primitive undeveloped one it occurred to me that a study of chest development might be

of some value. I measured the chests of some 19,000 Minneapolis school children from thirty schools in different parts of the city. Care was taken as much as possible to get a cross section of the entire city child population. This study, therefore, consists of chest measurements on 9,119 girls, and 9,438 boys, ranging in ages from five to eighteen years (Table 1).

Thoracic Index

Studies of the thoracic index in the fetus and the new-born have been made by both Hutchinson^{9,10} and Müller.¹⁴ They showed that in prenatal life the depth of the chest is greater than the width and at birth is about the same. The most comprehensive study of chest contours in the new-born and in infants during the first year

*From the Department of Medicine, University of Minnesota, and from Glen Lake Sanatorium, Oak Terrace, Minnesota. Read before the Southern Minnesota Medical Association, New Ulm, Minn., September 25, 1933.

TABLE I. THORACIC INDICES ACCORDING TO AGE

Age Years	Boys					Girls				
	No. cases	T. I.	Av. Dev.	St. Dev.	P. E.	No. cases	T. I.	Av. Dev.	St. Dev.	P. E.
5	266	720	3.9	1.54	±.063	238	710	3.2	1.52	±.066
6	784	707	3.0	1.39	±.033	733	717	3.57	1.36	±.034
7	722	718	3.47	1.44	±.036	826	707	3.4	1.41	±.033
8	878	703	3.2	1.32	±.032	903	707	3.1	1.30	±.028
9	986	702	3.3	1.33	±.028	935	706	3.2	1.11	±.024
10	1015	697	3.3	1.24	±.026	905	697	3.6	1.44	±.032
11	871	700	3.7	1.45	±.033	843	691	3.5	1.42	±.033
12	829	697	3.8	1.59	±.037	850	695	3.6	1.56	±.035
13	733	689	3.9	1.56	±.038	788	693	4.2	1.70	±.040
14	935	682	3.9	1.61	±.035	854	684	3.9	1.68	±.038
15	680	681	4.0	1.60	±.036	730	682	4.2	1.65	±.041
16	500	684	4.46	1.76	±.053	339	685	4.3	1.73	±.090
17	194	678	4.4	1.65	±.079	141	681	4.3	1.50	±.085
18	45	690	4.5	1.88	±.189	34	704	4.6	1.77	±.205

of life was that made by Scammon.^{16,17}

He showed that the thoracic index at birth is about 85 per cent and that with the establishment of respiration the thoracic index rises to about 106 per cent. In other words the chest at this period is deeper than it is wide. In the first twenty-four hours it flattens to about 102 per cent; in the middle of the second week to about 100.5 per cent; and in about three months or more to the thoracic index it had at birth. At the end of the first year the chest has flattened down to about 78 per cent (Fig. 2). This flattening-out process still continues at a considerable rate, for at the age of five years the thoracic index, as shown by our figures, is about 72 per cent. From this age to maturity the change in chest contour is very little, about 5 per cent in males and about 2 to 4 per cent in females (Graph 1).

Let us consider this from another angle. If we were to consider the change in contour of the chest from the end of the first inspiration to maturity we would observe that there is a difference of about 39. If we were to take this total of 39 to represent 100 per cent we would find that in the first year of life the chest has flattened out about 67 per cent. At the fifth year it has flattened out about 87 per cent. Thus there is not a great difference in the contour between the chest of a child five years of age and that of the fairly matured individual. The difference is only about 13 per cent in the male and even less in the female. This brings out a very important factor. It shows that in very early childhood the chest changes from the infantile, rounded type to the almost flat type. A rounded chest in late childhood or early adult age shows that

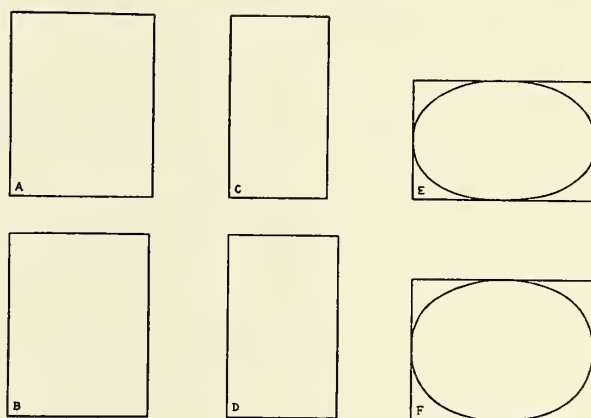


Fig. 1. Diagrammatic sketch of chest diameters. *A* represents the length-width index of the normal chest; *B*, the length-width index of the tuberculous chest; *C*, the length-depth index of the normal chest; *D*, the length-depth index of the tuberculous chest; *E*, the thoracic index of the normal chest, and *F*, the thoracic index of the tuberculous chest.

Length-width index is the ratio of the width of the chest to the length.

Length-depth index is the ratio of depth of the chest to the length.

its development has been hindered. It is the type similar to that found in tuberculous patients. It is the chest of early childhood upon which our attention should be focused, for in this period of life the greatest and most important development occurs.

Sex

It appears that girls have a flatter type of chest before the age of seven. Between the ages of eight and ten the boys' chests are definitely flatter than the girls, and again between the age of ten and puberty the girls take on a flatter chest contour. At about the age of thirteen the boys' chests again assume the flatter type of chest and continue so until the fully adult age.

Possible Etiological Factors Causing
Flattening of Chest

Possible Etiological Factors Hindering
Chest Development

Several theories have been offered. Mehnert¹³ proposed that gravity is a very important fac- Hofbauer⁷ demonstrated that upper respira-
tory infections resulting in nasal obstruction, en-

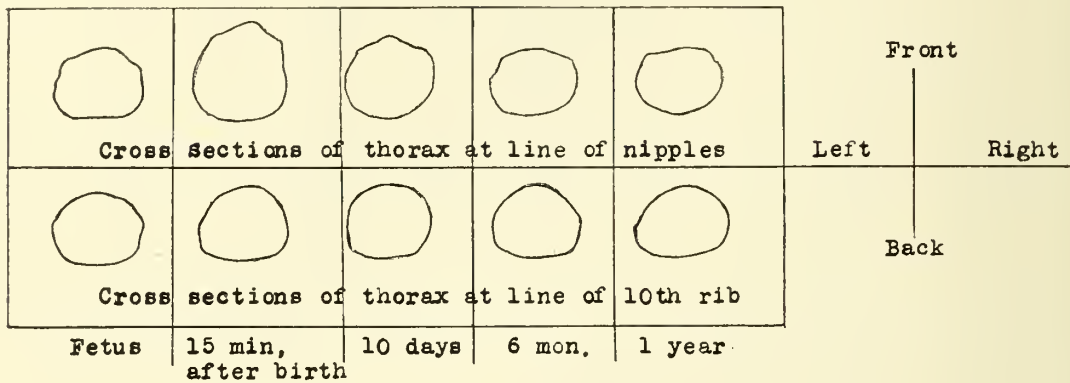
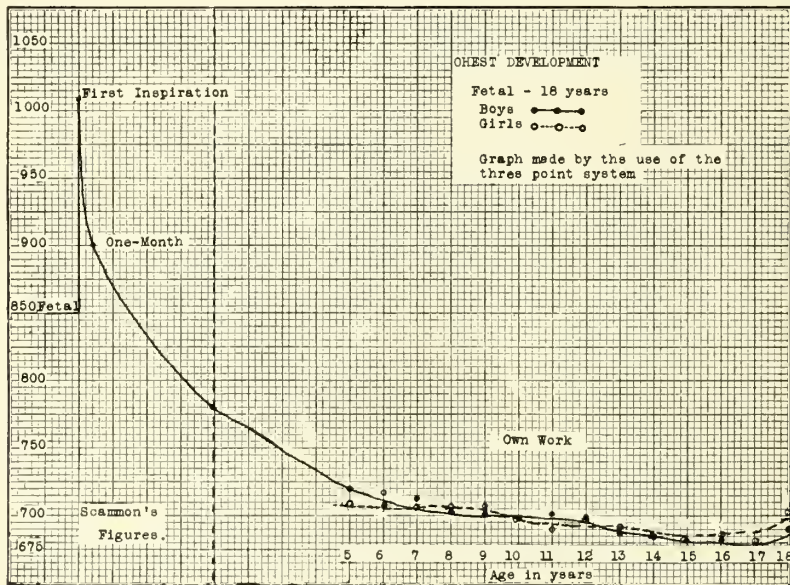


Fig. 2. A series of semi-diagrammatic outlines illustrating the change in the shape of the thorax in cross-section at the level of the nipple and at the level of the tenth rib, in the latter part of the fetal period in the first year. These are based on the data of Calkins and Scammon, Scammon and Rucker, and Richdorf (*Radiology*, July to December, 1927).



GRAPH I

tor.* Freund⁵ suggested the theory that an abnormal shortening of the first rib and an early sheath ossification of the cartilage may have some bearing on the shape of the chest. Champney² has shown that all parts of the lung do not inflate at the same time. Scammon¹⁵ believes that the descent of the diaphragm plays an important part.

*Mehnert's theory is based on the fact that the child spends most of its time on its back and abdomen, and that gravity perhaps plays an important part.

larged tonsils and adenoids, are important factors in hindering the development of the chest. Chronic bronchitis, asthma and whooping cough cause marked impairment of respiration. Hutchinson believed that the real cause for deep chests was abdominal disorders, such as gas, fixed mass of abdominal contents, and enlarged glands in the abdominal cavity, these interfering with proper action of the diaphragm. His explanation was that instead of the diaphragm using the vertebral

column and the inner margin of the lower ribs as fixed points, the center of the diaphragm becomes the fixed point. This causes the chest to be pulled inward and upward instead of downward and forward at each respiration. This condition, associated with rickets, gives rise to the large abdomen ("pot belly") in undernourished children.

I have data, which I shall discuss in the near future, to show that the children in the poorer districts are not so well developed physically as the children in the better districts. There is considerable evidence to show that improper foods and poor hygiene play an important part in proper chest development. Vitamin A has been shown to promote growth and resist infection, especially infections of the respiratory and gastro-intestinal tracts.^{1, 4, 8, 11, 15} The poor generally do not consume enough milk, butter, eggs, and green vegetables, foods that are rich in Vitamin A. They indulge more in less expensive foods, such as lard, vegetable fats and oils, foods that generally contain little or no Vitamin A.

What Can Be Done To Encourage Good Chest Development

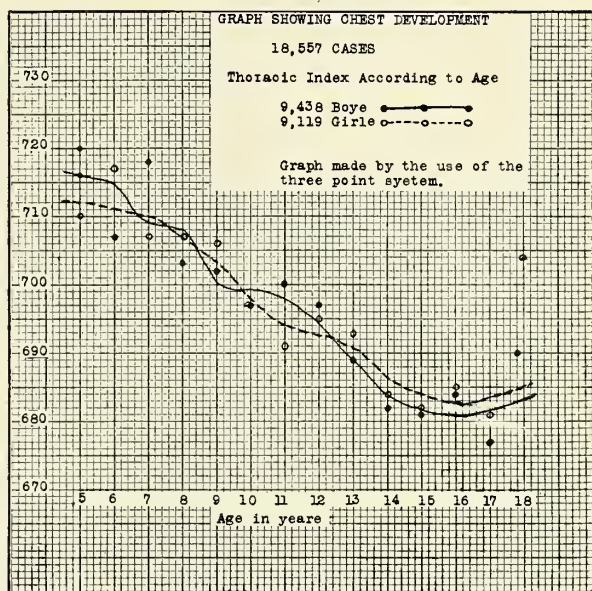
Gotz⁶ has demonstrated that with proper exercises the vital capacity in children can be increased. Malone¹² has shown that the vital capacity is as much as 40 per cent greater in the flat chest as in the deep chest with the same antero-posterior diameter.

Children should be encouraged to participate in sports, gymnastics, and games, especially those that are found to aid in the development of the muscles of the chest and of the back. Swimming, baseball, tennis, work on the parallel bars, on the gymnasium rings and on the climbing ladders with the back against the ladder, climbing ropes and even climbing trees are very desirable forms of exercises.

Because of the fact that 87 per cent of the chest development takes place in the first five years of life, it is necessary to study means and methods whereby the young child and the infant may be benefited. Proper foods, hygiene, and sunshine play important rôles in proper chest development.

Proper dietary instructions to expectant mothers may prove to be of the utmost value in giving the child a better start. The work of Dann³ on lower animals suggests the possibility of Vitamin

A reaching the fetal circulation by way of the placenta.



GRAPH II

Conclusions

1. The newborn's chest is almost round.
2. At the end of the first year the chest flattens out about 67 per cent, and by the fifth year it flattens out about 87 per cent.
3. There is little difference between the chest contour of a child at the age of five and the chest contour of a fully mature male adult.
4. My previous studies showed that the thoracic index of the normal chest of a mature male is about 67 per cent and in the tuberculous male it is 77 per cent; the thoracic index of the normal female's chest is 70 per cent, and of the tuberculous female's, 73 per cent.
5. The average girl's chest is flatter than the average boy's chest up to the age of seven, at which age the boy's chest begins to assume a slightly flatter contour.
6. A chest that is deep at maturity is a chest that has not gone through the normal process of development. Its progress has been hindered by some abnormality or disease.
7. The contour of the tuberculous chest is similar to the deep, undeveloped, primitive chest in infancy and in early childhood.
8. The healthy fully developed chest is the flat type of chest.

9. Proper hygiene, food and exercises can help the proper development of the chest.

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THE INJECTION TREATMENT OF HERNIA

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IT SEEMS a long step from the field of surgery to include hernia among those diseases which can now be cared for by the internist with his hypodermic syringe and needle. However, if the surgeon discovers that his recurrent or inoperable hernias, or, better still, those which he has declined to operate upon because of a high operative risk, recovers as efficiently with the injection treatment as with an operation, he must not hesitate to face the facts and accept the procedure which proves to be the most beneficial to the interests of the patient.

Review of the Literature

In reviewing the literature it was discovered that Valpeau⁸ in 1835 injected hernias with io-

dine. Although several others have tried iodine and other solutions since then, it appeared that the method acquired very little popularity until many years later when Mayer,⁵ in 1927, and Pina Mestra⁷ in the same year reported their many years of experience with the injection treatment of hernia.

For the past thirty years Mayer⁶ has been using the method and has obtained very satisfactory results. He has claimed 98 per cent cures in more than 2,000 cases treated. In this series he included umbilical, femoral and inguinal hernias. Wolfe⁹ reported 86 per cent satisfactory results on a small series of cases. Similarly Jameson and Cantala³ reported 62 cures in 64 cases treated by this method. In view of these reports recognition and credit must be given to those repu-

table men who have been able to obtain satisfactory results with this method, just as we have learned to recognize the value of the injection treatment of varicose veins and hemorrhoids.

sue appeared to penetrate and to be firmly attached to the adjoining muscle.

Present Investigation

Without doubt, men who have employed this

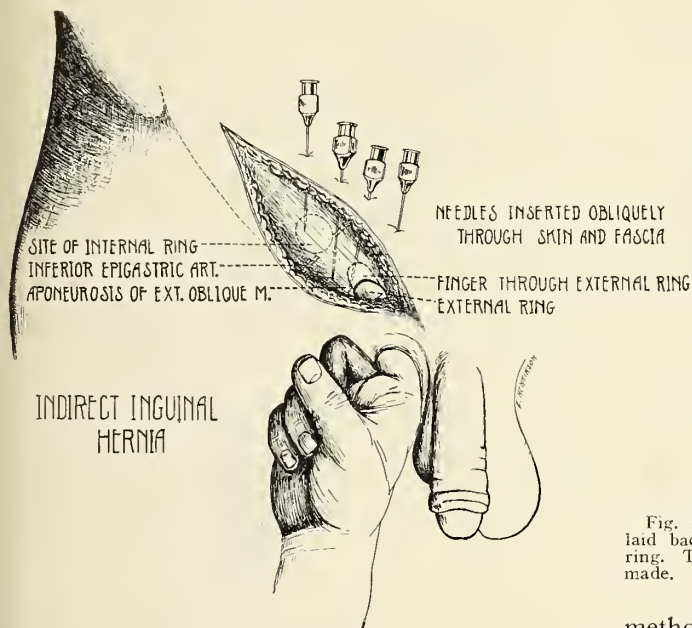


Fig. 1. This shows how the needles are projected obliquely caudadward, from above downward, so as to stay away from the peritoneal cavity. Only one injection is made at each setting.

As a result of the experimental work done in this field by Hall² in 1929 it was found that after the injection of the sclerosing solution there was a "vigorous proliferation of endothelial and connective tissue cells, together with large mononuclear phagocytes and foreign body giant cells" forming what has been designated as a foreign body granuloma. He also mentioned that after three or four injections sufficient plastic tissue was produced to obstruct the orifice of the hernial sac.

Wolfe reported that the injection of the solution into the cord in an experimental animal did not produce obliteration of the vas deferens.

Bratrude¹ and McKinney⁴ have used this method for the past two years at the Minnesota General Hospital and in their private practice with excellent results. In addition to this they have performed some experimental work and have found that after a seven week period of weekly injections into the inguinal region of a dog, very strong fibrous tissue had been produced at the site of the injection. There was no indication of hemorrhage, necrosis nor leukocytic exudation. The newly formed fibrous connective tis-

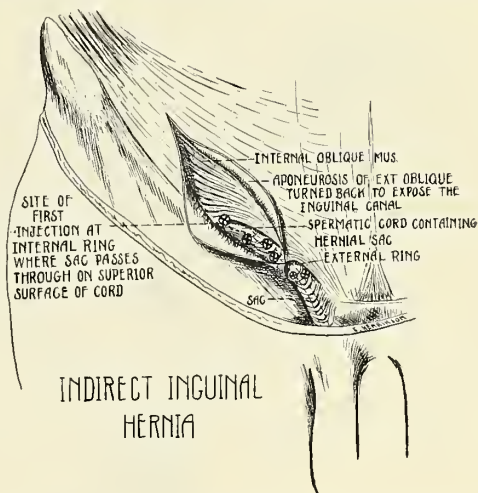


Fig. 2. The fascia of the external oblique muscle has been laid back so as to expose the inguinal canal and the internal ring. The circles indicate the sites at which the injections are made.

method for several years will obtain better results than the novice, but the skill required for its accomplishment is not beyond the reach of those who will devote a few conscientious hours learning the technic. On the other hand, it is not desired to convey the impression that this method is entirely without danger any more than the operative treatment of hernia is fool-proof. However, it would seem that the dangers with this method, in the hands of the beginner, would be definitely less than that which might be encountered in the operative treatment.

The object of the injection is to produce a proliferation of fibrous tissue at the site of the defect in the inguinal region, thereby narrowing the opening and strengthening the tissues so that the hernial contents cannot protrude.

This method is most applicable to indirect inguinal hernia but has also been used in direct inguinal hernia at this clinic.* It has not been tried in femoral hernia, ventral hernia nor in umbilical hernia as Mayer has done.

The topographical landmarks to be remembered are the anterior superior spine of the ilium and the pubic tubercle. Half way between these two points lies the internal inguinal ring with the inferior epigastric artery directly medial to it. Extending from this point to the external in-

*The Hernia Clinic at the Minneapolis General Hospital.

guinal ring is the inguinal canal. This is approximately 3 centimeters long in the normal individual. In one with a hernia this canal may be so much shortened and the rings so much enlarged

They used the solution which has been described by Pina Mestra.

In the eradication of the indirect inguinal hernia it should be kept in mind that the internal

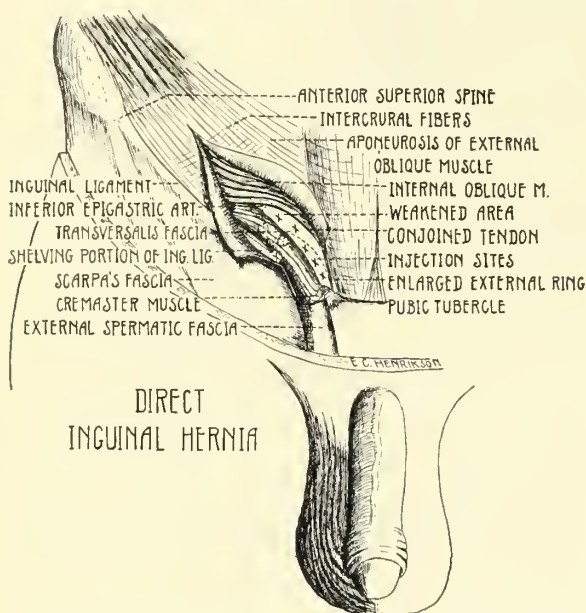


Fig. 3. The fascia of the external oblique muscle has been laid back so as to expose the weakened area below the conjoined tendon, the site at which the direct inguinal hernia protrudes. The crosses indicate the sites at which injections are made in the plane of the transversalis fascia. Some of these injections are made under the spermatic cord by retracting the cord laterally with the finger placed in the external ring as indicated in Figure 1.

as to make it appear that both rings lie almost directly over one another. In that event it may be difficult to determine whether the hernia is a direct or an indirect one. This, from the standpoint of treatment, is an important consideration. The indirect inguinal hernia often, but not always, extends into the scrotum.

Technic

The solution used consists of phenol 2 parts, alcohol 1 part, oil of Thuja 1 part. In view of the fact that this solution has proven so satisfactory and, as far as determined, has no undesirable effects, no attempt has been made to experiment with other solutions. The quantity injected should not exceed ten minims. Each injection is given at weekly intervals while the patient is kept ambulatory. Aside from a slight burning sensation which lasts for a few minutes after the injection of the solution, there are no untoward effects observed at the time of the treatment. Jameson and Cantala used procaine hydrochloride to allay the pain of the injection.

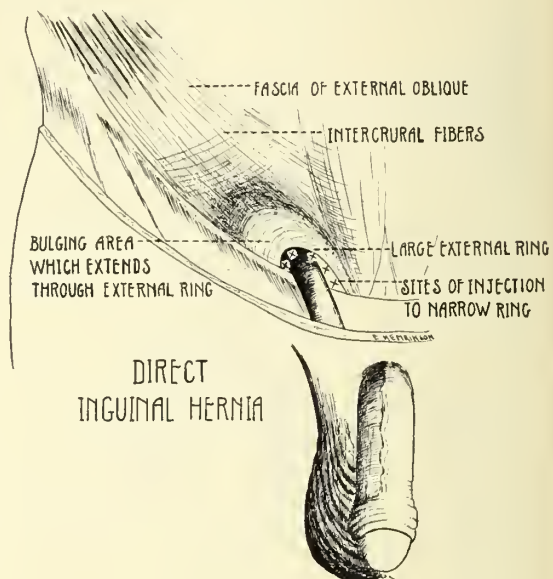


Fig. 4. After the transversalis fascia has been sufficiently strengthened the subsequent injections are made around the margin of the external ring as indicated by the crosses.

inguinal ring is to be made narrower from its lateral side; the inguinal canal is to be contracted from its upper surface, the surface most adjacent to the sac, and the external inguinal ring is to be made narrower from above downward.

With the patient lying on his back and the hernia reduced, the first injection is made at the site of the internal inguinal ring. The needle is passed through the skin and fascia of the external oblique muscle with the point directed obliquely caudalward (Fig. 1). This is done to avoid any possibility of projecting the needle into the peritoneal cavity, as might be done if the needle were directed from below upward or even perpendicular to the surface. As the needle passes through the fascia of the external oblique muscle a sudden lack of resistance is felt much as would be experienced in passing a needle through a heavy sheet of paper. This determines the position of the needle point below the fascia of the external oblique muscle and is the criterion for determining the location where the solution is to be placed.

Subsequent injections are made at weekly intervals along the inguinal canal, progressing toward the external inguinal rings (Figs. 1 and 2).

Eight or nine injections are usually necessary to accomplish this. Sometimes many more are necessary. Not infrequently two or three injections seem to be sufficient.

In direct inguinal hernia the procedure is somewhat altered, for here the hernia is the result of a defect through the posterior wall of the inguinal canal, medial to the inferior epigastric artery in the space designated as Hesselback's triangle. It is usually associated with an exceptionally large external inguinal ring. This type of hernia never extends into the scrotum. Here the important consideration is to strengthen the tissues in the plane of the transversalis fascia overlying Hesselback's triangle and to narrow the external inguinal ring. This is accomplished by injecting into the weakened tissue of the transversalis fascia below the conjoined tendon, and subsequently injecting at the site of the external inguinal ring anterior to the cord. The internal inguinal ring plays no part in this type of hernia (Figs. 3 and 4).

It has been found that the direct hernia always requires more injections than the indirect hernia. This may be explained by the fact that more fibrous tissue is required to close the defect than is necessary with the indirect hernia where the obliquity of the canal is an important factor in adding strength to the involved structures.

The Truss

It is important that a well fitting truss be used and that it hold the hernia completely and continuously reduced. If this cannot be done, the injections should not be given because even though the solution may produce proliferation of fibrous tissue its production will be of no benefit. The Smithsonian truss has been found most applicable for the indirect inguinal hernia. By varying the size of the pad and the degree of pressure through the spring mechanism of the truss most hernia can be held reduced.

The French type of truss with its broader and flatter pad has been found more applicable to direct hernia or to those indirect herniæ in which the abdominal inguinal ring and the subcutaneous inguinal ring are more closely approximated to one another, giving much the same effect as that of the direct hernia.

The Hood truss has been used in obese individuals with very large herniæ because in these cases it has been found that the pressure required to hold the hernia in position is much

greater than that which can be obtained with any of the other types.

Sequelæ

A tender indurated discrete mass occasionally develops in the region of the cord after the injection. This indurated mass appears to lie in the region of the hernial sac. No serious consequences have developed from this localized area of induration. When this has occurred it has always subsided gradually after a period of from one to six weeks leaving an obliterated hernial sac but no other evidence of its former existence.

This induration of the cord does not seem to be a thrombophlebitis because it has been found not to extend the entire distance of the cord but always has ended abruptly at a variable distance down the cord, usually at the site to which the hernial sac protruded.

In an effort to determine the nature of this swelling it was decided to insert a needle into this mass. To our surprise it was discovered that after forcing the needle through a thick dense indurated wall of tissue it passed into a space from which clear yellow serous fluid could be aspirated. Therefore it was concluded that this was a chemical inflammatory reaction in the sac with consequent edematous obliteration of the orifice at the abdominal inguinal ring, exudation into the resulting hydrocele and subsequent fibrous tissue proliferation.*

Edema of the scrotal skin on the side which had been injected has also been observed following some of the injections. Likewise edema of the prepuce has been seen. These conditions have readily cleared up spontaneously without further complications.

A few patients have reported that they felt weak and nauseated for a day or two after the injection. This was especially observed when the induration of the cord was extensive.

A superficial ulceration of the skin was observed in two cases. This occurred in one patient who had received no injection but was wearing a Hood truss for the purpose of accustoming himself to the intense pressure which was required to hold the hernia in place. The other patient had received one injection on the same day that the truss was applied. Both ulcerations cleared up within a week after the truss was removed.

*Since this paper has been presented for publication this contention has been definitely proven and will be dealt with at a later date.

It seemed clearly indicated that the necrosis was due to the pressure of the truss rather than from any irritating substance in the injection fluid. All patients are now required to wear their truss for a week before the injections are started in order to accustom themselves to its pressure. No other complications or sequelæ have been observed in this clinic. No epididymitis, no orchitis and no atrophy of the testicle has been observed. No peritoneal irritation nor delayed hemorrhage has been encountered. No strangulation has been seen.

Jameson and Cantala report two types of local reaction, one consisting of an aseptic inflammation of the canal, the other a swelling of the cord. These reactions did not interfere with the continuation of the treatments.

Contra-indications

Mayer lists among the contra-indications for this treatment the presence of syphilis, tuberculosis or diabetes. Cancer and any condition producing ascites may be added to this list. Irreducibility or inability to maintain reduction with the truss should likewise be included among the contra-indications. Incarceration of the contents within the sac should also not be treated by this method.

Conclusions

The injection treatment of hernia when properly applied seems to be fully as efficacious as

the surgical treatment. There are no untoward results from this method of treatment. Mayer in a series of over two thousand cases reports no atrophy of the testicle, no orchitis nor epididymitis, and no case of sterility following this method of treatment. This type of treatment for hernia should be recognized by the medical profession and should be given its proper place in the therapy for those who are suffering from rupture.

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ANESTHESIA FOR RECTAL SURGERY

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ANESTHESIA, in recent years, has become quite selective, whereas, formerly, the choice lay between ether and chloroform. The introduction of several new anesthetic agents and new methods of administration of these agents has enabled the surgeon to consider the character of the work to be done and choose that anesthetic best adapted to the case at hand. He may now consider the safety of the patient with any substandard cardiac or pulmonary conditions in mind as well as the efficiency of the anesthetic from the standpoint of both the surgeon and the pa-

tient. In perhaps no type of work can a well chosen anesthetic be of more importance than in the practice of proctology, from the initial examination on to the completion of the operation.

Fear of discomfort, pain and embarrassment too frequently experienced by patients in the course of a proctoscopic examination has caused many patients to defer reporting symptoms suggestive of rectal disease to their physician. This examination, conducted with the comfort of the patient in mind, may be done with amazing freedom from the very features the patient has been

fearing. Proper position and "vocal anesthesia" will overcome the patient's apprehension and facilitate the mechanical part of the examination to a marked degree. By "vocal anesthesia" the examiner can concentrate the attention of the patient on cooperating with him in making the examination as easy as possible. Anticipating the sensations the patient is about to experience and voicing them to the patient so that he will realize that nothing unusual or disastrous is about to overtake him will occupy the attention of the patient during the few moments required for the introduction of a sigmoidoscope. No other anesthetic is ordinarily required for the examination and the danger of perforating the sigmoid on an unconscious patient is obviated. Any anal lesion which is so tender that introduction of the index finger causes severe pain, should be examined under sacral anesthesia in a hospital with preparations completed to do any operation necessary at the same time.

Anesthesia For Operative Rectal Work

The advantages of sacral anesthesia for any lesion situated below the reflexion of the peritoneum from the anterior wall of the rectum make any other type of anesthesia a second choice. When the technic of administration is perfected it is probably safer for the patient than any other anesthetic except local infiltration of procain. It obviates the contamination of the operative field by fecal matter so frequently experienced with the labored respiration accompanying a general anesthetic and it gives perfect relaxation of the sphincter without the distortion and bulging of the anus seen in general anesthesia.

Local anesthesia, in the hands of those I have seen use it, has not given adequate relief from pain nor sufficient relaxation of the sphincter, and distorts the operative field. Moreover, the injection of this fluid in an infected area where ulcerating lesions and thrombotic or necrotic tissue are frequently found is oftentimes not free from danger.

Spinal anesthesia, of course, gives the same relaxation and anesthesia as does sacral, but to my mind it adds a definite risk to the patient even when given low in the spinal canal and when small dosage of novocain crystals is used. It is frequently unsafe to get a patient, to whom spinal anesthesia has been administered, on his feet after twenty-four hours, as one may do in

rectal cases when sacral anesthesia has been given. It may prove a source of embarrassment to the surgeon who has promised his patient he will be released from the hospital after three or four days to find a post spinal headache necessitating the patient's confinement to bed for two or more weeks. In cases where the lesion is beyond the range of sacral anesthesia and no contraindications exist, spinal anesthesia provides advantages over a general anesthetic. Colostomies and resections of the rectum of any type are very nicely done under spinal anesthesia with the advantage of bowel immobility and probably a decreased danger of such postoperative complications as peritonitis and pulmonary difficulties.

The use of spinal anesthesia in these areas outside the range of sacral anesthesia is mentioned to show the desirability of the selection of the anesthetic depending on the specific requirements for operations in various areas, but I am sure many medical men would hesitate to accept spinal anesthesia on themselves for a hemorrhoidectomy or fistulectomy knowing that the safer and equally satisfactory sacral anesthesia was available.

General anesthesia causes so much engorgement of the hemorrhoidal venous plexus with consequent distortion that it becomes difficult or indeed impossible for the surgeon to determine how much of the distortion present is due to the anesthetic engorgement and how much is due to hemorrhoidal disease. Moreover, the anal sphincter is the last musculature of the body to relax under general anesthesia, so that a maximum depth of anesthesia must be produced to give the necessary sphincter relaxation. An unsafe deepening of the anesthesia is apt to result from dilatation of the sphincter with its resultant stimulation of respiration in a patient already deeply anesthetized.

It has been of interest to record the results of the anesthesia for rectal surgical cases when sacral or spinal anesthesia was used. In checking back records of sacral anesthesia one hundred and thirty-five cases were recorded. In this group the average fall in systolic blood pressure was 6 per cent and the maximum 14 per cent. No untoward reactions such as marked depression of respiration were noted. Four per cent of these patients developed nausea while the anesthesia was in effect and were administered oxygen for a few minutes. Notation was found on

six cases that work was started before the anesthetic had completely relieved the pain. This was the only respect in which the anesthesia was found unsatisfactory and I feel that it was due to the use of novocain solution which was colder than body temperature. I have recently been more careful to see that the solution is kept at ninety-nine degrees and there has been no repetition of this objectionable feature.

Anesthesia lasted for a longer time, in every instance, than was required to do the operation and get the patient in bed afterward. Included in the list were two cases of anal fistula in which the resection required one hour and forty-five minutes and the duration of this anesthesia was ample. In no case was there any paresthesia, numbness or distortion of sensation after the anesthesia had worn off. One individual complained for ten days that there was some soreness where the needles blocking the second, third and fourth sacral nerves had penetrated. Twenty-four patients or 17.7 per cent required catheterization for a variable period after their operations; some of this may have been due to the anesthetic but much of it was due to the reflex irritability set up by the rectal wound. No cases

of postoperative headache or respiratory paralysis were noted.

This, of course, paints a picture of greater safety for the patient than can be afforded by spinal anesthesia and at the same time a freedom from technical difficulties necessarily present when a general anesthetic is given. Its limited use must be attributed to one or both of two reasons. In the first place the advantages sacral anesthesia offers are not appreciated by many surgeons; it has not been extensively described in medical literature. Publications by Lundy on sacral anesthesia are undoubtedly the best available and are clear and complete in details of administration technic.

The only other reason for its lack of general acceptance is the technical difficulty met with in finding the bony foramina through which the caudal canal and sacral nerves may be reached. It is more time-consuming and more difficult to give than spinal anesthesia, but when the technic is mastered and its advantage appreciated through use, advocates of its use will multiply. The preoperative sedation as well as the details of administration have been so excellently described by Lundy that there is no need for repetition now.

THE SURGICAL TREATMENT OF HEMORRHOIDS*

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THERE have been many methods devised for surgical removal of hemorrhoids, though recently with the advent of the injection treatment of hemorrhoids, hernia and varicose veins, it would seem that in the future a hypodermic syringe may be the only instrument needed as a complete armamentarium of a surgeon. However, in so far as hemorrhoids are concerned, after the enthusiasm of the injection method has subsided and enough time has elapsed to evaluate the permanent results secured by injection, I know from my own experience of eighteen years with the injection method, that it will be found that fully 50 per cent of all cases of hemorrhoids

cannot be completely cured without operation. Furthermore, many patients prefer the surgical removal with a short period of complete disability to the more prolonged period of time involved in the ambulatory method, even though there be no period of complete disability. I think this will be more true, once the public can be made to realize that a hemorrhoidectomy properly done and properly cared for afterwards, is not such an excruciating ordeal as is pictured by those who have undergone a clamp and cautery operation followed by the insertion of a large rubber tube or plug of gauze.

It is the purpose of this paper to describe a procedure, which, with slight modification, can be applied to any case of uncomplicated hemor-

*Read before the annual meeting of the Southern Minnesota Medical Association, New Ulm, Minnesota, September 25, 1933.

rhoids. As we all know, hemorrhoids consist of a group of varicose hemorrhoidal veins and some interstitial tissue. If the hemorrhoid is of the interno-ano-external type, it is covered with the mucous membrane of the rectum, the anal mucosa and the perianal skin. Since the involved blood vessels are enlarged and bulging, the covering over them is also stretched and redundant. The problem, then, is to remove the varicose vessels and their interstitial tissue, and at the same time, remove enough of their covering so that no skin tabs or redundant mucosa will be left. It is also just as important, or even more so, to leave sufficient mucosa and skin to line the lower portion of the rectum and anal canal so that adequate dilatation may occur for defecation, and a stricture be avoided.

This operation procedure is most easily and thoroughly accomplished by leaving the hemorrhoids in their normal position and doing the operative procedure through an especially devised anoscope. In no case should the hemorrhoid be everted as is usually done. The hemorrhoid to be treated is isolated in the slot of the anoscope. In this position, it is freely visible and accessible, and the exact amount of tissue necessary to be removed can be determined before the incision is made. This decided, a plain catgut suture is placed through the uppermost portion of the hemorrhoid. This is for the purpose of securing the large blood vessel entering the upper pole of the hemorrhoid, thus minimizing bleeding during the operative procedure. An incision is now made from the lowermost part of the hemorrhoidal mass to its extreme upper pole. In case of an interno ano external hemorrhoid, the incision would begin in the skin covering the outermost margin of the external portion of the hemorrhoid to be removed and extend upward through the anal canal, and to the upper margin of the internal

hemorrhoid, which may be one or two inches inside of the rectum. A second incision is made laterally and parallel to the first and a V-shaped piece of tissue removed. In removing this preliminary wedge of tissue, the amount of skin and mucosa to be removed should be estimated so that the mucosa and skin remaining will be sufficient to cover the denuded areas after the varicose vessels are dissected out. After the original section is removed, the edges of the mucosa are retracted with forceps, and the remaining vessels dissected out until the sphincter muscle and the circular muscular coat of the rectum are freely exposed. This insures all of the diseased vessels being removed. The cut edges are now brought into apposition at a few points with plain catgut suture. This is more to control bleeding, for the normal contracture of the anal canal is sufficient to bring the cut edges into apposition.

In certain cases there may be a generalized enlargement of a complete ring of hemorrhoidal vessels, rather than the presence of the typical three distinct hemorrhoids. The principle, however, is the same. Several sites are selected about the rectum and anus, a longitudinal incision made along the full length of the varicose area and the vessels dissected out. Usually in these cases but a small amount of mucosa is removed. Several incisions should be made and the lateral dissection made through one incision should meet the lateral dissection made from the adjacent incision. In this way all the varicose vessels about the entire circumference of the anal canal and rectum are removed. Any skin tags or other pathology are cared for and the patient is returned to bed. Hot sitz-baths are started the next day, the bowels are moved on the second day by means of an oil and water enema, and on the fifth day, the patient usually leaves the hospital.

STRYCHNINE POISONING

Strychnine poisoning is rather frequent, and its occurrence is rendered dramatic by the dreadful agony of its course and the commonly fatal termination. Most of the sources of poisoning could be easily avoided, especially in the tragic cases of infants. Moreover, the agony of the developed poisoning can be completely eliminated and nearly all fatalities could probably be prevented by proper treatment. The most prolific source of strychnine poisoning is chocolate or sugar coated household laxative or "tonic" pills. The dreadful slaughter from household "remedies" is the more regrettable since it has not been proved that the

strychnine in laxative pills serves any useful purpose. Some restriction of the promiscuous sale of this violent poison in the guise of supposedly harmless household remedies is necessary and the board of trustees of the American Medical Association are considering the question of action along these lines. In the treatment of strychnine poisoning, the barbituric acid derivatives have opened a new chapter. They do not differ from the older hypnotics in principle but rather in the combination of high efficiency with relatively high safety, and by the fact that they may be administered intravenously in emergencies such as strychnine poisoning. (Jour. A. M. A., June 4, 1932, p. 1992.)

CASE REPORTS

SPONTANEOUS RUPTURE OF THE HEART

Report of Three Cases

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Case 1.—C. A. P. (No. 7687), a single white male, sixty-seven years old, was admitted to the St. Peter State Hospital, St. Peter, Minnesota, on September 12, 1898, at the age of thirty-three. Physical examination revealed no abnormalities except a harsh blowing murmur, diastolic in time, over the left second costal interspace. He was uninterested and seclusive with occasional outbursts of excitement. Frequently he would stand in a fixed position for hours at a time.

In the fall of 1904 he had an attack of acute nephritis, which confined him to bed for a month. Following this he was quiet and coöperative. During the last twenty-seven years of his life he worked steadily in the hospital greenhouse. In the afternoon of October 4, 1932, a few minutes after returning from work, he was found sitting on the toilet stool dead.

Autopsy.—The pericardium was distended with blood. The apex was firmly adherent to the diaphragm. On the postero-lateral surface of the left ventricle there was an irregular tear about 4 cm. in length extending through the heart wall. The weight of the heart was 550 gm. Dr. Margaret Smith, Northwestern Hospital, Minneapolis, who examined the hearts in Cases 1 and 3, reported that the microscopic examination showed sclerosis of the coronary arteries and fibrous degeneration of the heart muscle.

Case 2.—M. S. (No. 13564), a white married woman, fifty-nine years old, was admitted to the St. Peter State Hospital on November 7, 1917, at the age of forty-three. She was excited, confused, hallucinated and untidy. Physical examination showed no essential abnormalities.

Except for occasional swelling of the ankles the condition did not change until the last year, when she gradually became weaker. In the latter part of October, 1933, she developed erysipelas. She recovered promptly and was able to sit up on the first of November. At three o'clock in the morning of November 9, 1933, the nurse found her dead in bed.

Autopsy.—Marked generalized arteriosclerosis was noted. There was an aneurysm involving the distal end of the abdominal aorta and both common iliac arteries. The pericardium was distended with 180 c.c. of coagulated blood. The heart, which weighed 300 gm., showed a tear in the wall of the left ventricle along the anterior sulcus. This was 3 cm. in length and 4 cm. from the apex. Dr. E. T. Bell, University of Minnesota, who examined the heart, reported: "The heart from M.S. shows an advanced sclerosis of the coronary arteries with marked narrowing of the lumen and thrombosis, especially in the first part of the left coronary. Microscopic sections of this artery show a typical arteriosclerosis with thrombosis. There is an infarction of the muscle of the left ventricle with rupture of the superficial myocardium which allowed the escape of blood into the pericardial cavity."

Case 3.—F. P. (No. 7105), a single white male, sixty-six years old, was admitted to the St. Peter State Hospital on August 18, 1880, at the age of thirty-three.

The symptoms shown were schizophrenic in nature. He gradually improved and was discharged as recovered August 3, 1887.

On April 21, 1896, he was readmitted. At that time he was restless, confused, and delusional. With the exception of coarse tremors of the tongue, no physical abnormalities were noted. He was quiet a few months after admission and began to work in the greenhouse. This work he continued until March 17, 1914, when he was found dead in bed early in the morning.

Autopsy.—A punched out rupture was found on the anterior aspect of the left ventricle about 3 cm. from the apex. Microscopic examination, made in February, 1933, showed chronic suppurative myocarditis and sclerosis of the coronary arteries.

Comment

The first two cases, together with one previously reported (1), occurred in a series of 207 routine autopsies performed in a state hospital between July 1, 1927, and November 9, 1933. During this period there were 1,227 deaths. All of the patients reported were elderly individuals, who had been in the hospital a number of years. No serological examinations were made.

A CASE OF TRICHOBEZOAR*

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Opaque foreign bodies of the stomach are not a particularly interesting group from the roentgen standpoint. There is usually the history of accidentally swallowing some opaque substance. Films readily reveal their presence. There is, however, a fascinating group of non-opaque foreign bodies known as bezoars. The hair ball or hair cast of the stomach belongs to this group.

Bezoars have been recognized as an entity since the twelfth century B. C. The word is derived either from the Arabian or Persian, and refers to concretions of various kinds found in the stomachs and intestines of man and animal. These bezoars were highly prized as remedies against poisons and pestilential diseases. They were also thought to protect from evil and were, therefore, worn around the neck as a charm. They are commonly found in the cow, horse, and rat during the shedding season.

The first case of bezoar was reported in the *Journal de Medecine*, Paris, in 1779 by Baudamant. The first operative case was reported in 1883 by Schoenboin. More than 140 cases of bezoars have now been reported. Many of these cases were encountered at the postmortem examination, while others were diagnosed at exploratory operations. Since the advent of the x-ray and the realization of such an entity bezoars are quite readily diagnosed.

*From the X-ray Department of the Minneapolis General Hospital.

Bezoar is a term used to describe the entire group. There are two main subdivisions. The trichobezoar, which refers to those concretions in the stomach made up of hair, and the phytobezoar, composed of vegetable matter such as skins, seeds, and the fibers of fruits and vegetables. Some authors consider a third group,

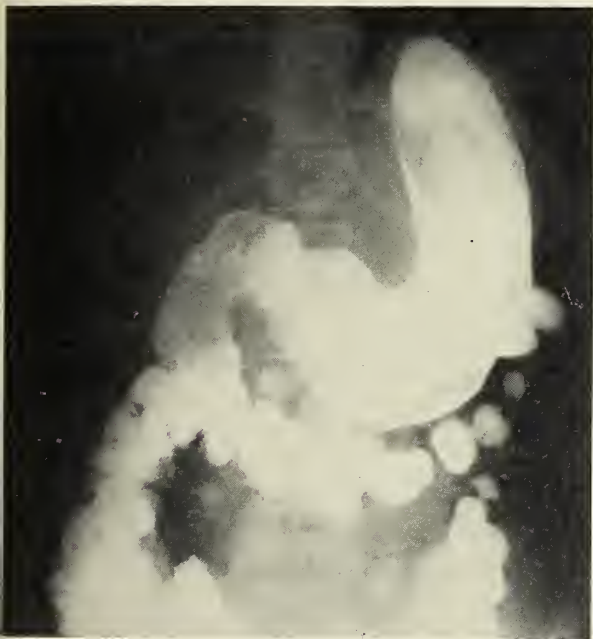


Fig. 1. Film made at the six hour period demonstrating areas of rarefaction in the stomach from the cardiac end to the pylorus as well as in the first and second portions of the duodenum.

that is concretions. These, with few exceptions are composed of shellac. The concretions are usually found in painters and employees in furniture factories who drink furniture polish. The trichobezoar is the most common of all bezoars. Of the 139 bezoars reported in the literature, 119 were trichobezoars. The seeds and skins of the persimmon make up the greatest number of phytobezoars.

The trichobezoar or hair cast is more commonly found in the female than in the male. The hair swallowing habit occurs early in life. The greater occurrence in females is apparently due to the fact that braids are worn by girls, thus making the hair more accessible. This, however, is not the entire explanation, since the hair is often pulled out and then swallowed, as was the case with our patient. There are only four cases on record of hair cast in the male. One man had developed the habit of chewing the end of his beard. Another man had developed a unique method of combating a self diagnosed hyperacidity by either swallowing hair or dangling a cord of it in his stomach with one end fastened to a string, so that it could be brought back.

For the most part, these patients are mentally sound. We know that insane people eat foreign bodies, but they choose more solid substances. Hair casts in the insane are rather an infrequent finding. Hair, of course, is often found with other more solid substances, but hair casts in themselves are not often found in the

insane. Some of the reasons for the abnormal appetite, as quoted by Butterworth in his survey of the literature are: "because it felt so nice," "to clean her tongue," "makes her voice clear," "liked the tickling sensation produced in passage to stomach," and one "for suicidal intent."



Fig. 2. Specimen removed at operation. Weight 480 grams.

The health of those people practicing trichophagia suffers very little at the outset. Later they complain of pain, vomiting, dyspepsia, constipation alternating with diarrhea, offensive breath, and anemia. Later they have difficulty in swallowing food, followed by emaciation, weakness, and finally death from inanition, from perforation of an ulcer which may be associated with the bezoar, or from obstruction.

The diagnosis of hair cast is rather readily made by roentgen study. It is possible that some difficulty may be encountered in distinguishing it from benign polyp when the bezoar is not very large. However, when it has completely taken up the stomach, as it eventually does, I know of nothing for which it can be mistaken. The stomach contour is maintained, and the walls are pliable. The barium distributes itself over the surfaces of the foreign body. As a result, we obtain a film showing a barium filled stomach, within which there are areas of rarefaction. The six hour study probably gives the most characteristic appearance. It is at this time that most of the barium has left the stomach, leaving the bezoar coated with barium, so that the individual strands of hair can almost be identified on the film.

Case Report

The history is that of a sixteen year old white female, who was admitted to the hospital for diagnosis and treatment of a large palpable tumor occupying the upper abdomen. She gave a history of having spent the past six weeks in bed because her legs became swollen and

sore to touch. The swelling, which was greater on the left side disappeared with rest in bed. For the past two weeks the patient complained of crampy pain in the abdomen which was worse at night. She had not noticed anything particularly wrong with her appetite until the past week. The patient states that three days previous to admission, she noticed a mass in the left upper quadrant, which seems to have increased markedly. She remembers a somewhat similar mass six months ago. This disappeared after catharsis. At the time, she thought it was due to constipation. Catharsis for the mass present at this time was not effective. The patient also complained of vomiting. This came on within the past week and relieved her pain.

Physical examination revealed a young female who was well developed and fairly well nourished. She was quite comfortable. A hard smooth tumor mass which moved slightly with respiration was palpated in the upper left quadrant. This extended beyond the midline. The other positive finding was the slight edema of the ankles. The physical findings were otherwise negative. The blood and urine were both negative.

X-ray studies demonstrated a tumor within the stomach. Fluoroscopically, it was noted that the barium spread itself over the tumor mass so as to define a stomach normal in contour, but of increased size. Peristalsis was not visible. The first and second portions of the duodenum gave the same appearance as the stomach. The duodenum was of increased caliber. The walls were intact. The lumen was taken up by the barium, which gave a mottled appearance. At six hours a more brilliant appearance was obtained (Fig. 1). Most of the barium had left the stomach but enough had remained to coat the foreign body. A diagnosis of trichobezoar was made. The patient ultimately admitted pulling out her hair and then swallowing it. She says she did this because she felt nervous. She gave a two year history of such a practice, but did not associate this habit with her present condition.

The hair cast (Fig. 2) was removed at operation by Dr. Moren. The patient made an uneventful recovery.

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CHERRY STONE IN THE MAXILLARY SINUS

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Foreign bodies, other than teeth and tooth roots, in the maxillary sinus are rare. A foreign body may remain in the sinus for years without causing trouble. It usually is discovered when a patient develops symptoms of sinusitis or when an x-ray of the sinuses has been taken for some other reason.

The mode of entrance may be in one of three ways: (1) Through the natural ostium or an accessory one; (2) through the osseous walls (either the nasal or maxillary); (3) through an artificial opening in the alveolar process.

I wish to report a case of foreign body in the right maxillary sinus removed by radical operation.

Case Report

Mrs. F., aged 48, housewife, white, was on the Medical Service, under observation, for hyperthyroidism. Because of her history and complaints relating to her sinuses, an x-ray was taken. The x-ray department made this report: "Marked cloudiness of the right antrum, within which is demonstrated a sharply circumscribed calcified area, which may represent a calcified cyst. It may also represent a foreign body. We do not think that this is outside this sinus, although it can best be determined by lateral study."

A lateral x-ray study was done three days later, in which they stated this mass was within the antrum.

The dental department was consulted and exploration of the maxillary alveolus for an unerupted tooth was advised. This was done and no tooth found. Their exploration carried well up into the anterior wall of the antrum.

On our recommendation, the case was transferred to the Eye, Ear, Nose and Throat Department for a radical operation on the maxillary sinus.

The following history was obtained on our service:

All upper teeth had been removed in 1920, the extractions extending over a period of three weeks. Local anesthesia was used. The teeth were hard to extract and fourteen were found devitalized and infected. A denture was in place forty-eight hours after the last extraction. The foreign body might possibly have gained entrance into the antrum at this time through an opening in the alveolus.

The first symptoms in the right maxillary sinus did not appear until 1927. At this time, the patient had severe pain in the right cheek, lasting one week. No x-rays were taken although irrigation of the right antrum gave marked relief. The patient has had a dull, heavy feeling in the antrum, accompanied by a troublesome postnasal discharge since 1927. The first x-ray of the sinuses was taken in 1933, which incidentally led to the discovery of the foreign body.

Operation.—A Caldwell-Luc operation was performed on the right maxillary sinus. The maxillary wall was found deficient, evidently the result of the exploration performed by the dental department. The sinus membrane was very thick and polypoid, and following the removal of this membrane, the hard mass was found on the floor of the sinus. Further examination revealed the sinus floor almost deficient over the alveolar process. The mass, which was encapsulated in hard, fibrous, connective tissue, was removed in toto together with the remaining portion of the membrane of the sinus. The opening into the nose was made in the usual manner.

The laboratory findings of the removed tissue showed the following:

One fragment was of loose connective tissue, almost surrounded by tall columnar epithelium. Within were a number of glands of similar epithelium infiltrated intensely by all types of leukocytes. Another fragment was of dense fibrous tissue infiltrated by lymphocytes.

The hard encapsulated mass was examined by the dental department, which reported that they were definitely certain that it contained no tooth structure.

No trace of metal was found. We then examined it with a small dental burr and the mass was found to be hollow. In all appearances, both inside and outside, this mass strongly resembles a cherry pit.

All head pains, referable to the maxillary sinus, have entirely disappeared and recovery was uneventful.

EDITORIAL

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BUSINESS MANAGER

J. R. BRUCE, Saint Paul

Volume XVII MAY, 1934 Number 5

"Vegetable Mucin" In the Treatment of Peptic Ulcer

The potentiality for ulceration in mucous membranes seems to arise whenever and wherever the acid chyme is permitted to impinge on such tissues. Physiologists have suggested that the more concentrated the gastric acid, the more likely it is to be associated with ulceration. Tissues which normally are in contact with the erosive acid chyme have greater protective qualities than do other mucous membranes.

From the duodenum to the colon, the mucosa of the gastro-intestinal tract is diminishingly resistant. Ordinarily the cells of the stomach or duodenum are capable of resisting the eroding action of the acid chyme. Periods develop, however when, either because of an increase in the eroding action of the gastric juice or because of failure in the cell-protecting mechanism disintegration of the cells takes place locally, with resulting ulceration. Sometimes after treatment, and occasionally without therapeutic interference, the defense mechanism in tissues revives or the aggression factor recedes and the ulcer heals. In time, however, the scales are again tipped and further erosion takes place; thus alternating periods of healing and activity succeed each other throughout the life cycle of this interesting disease.

The rationale of most successful therapeutic procedures instituted to cure peptic ulcer has centered around efforts to reduce or to control gastric acidity. It has never adequately been

shown that chronic peptic ulcer will develop in the absence of free hydrochloric acid in the gastric content. It was assumed, therefore, that if the gastric acids could be controlled, a chemical environment favorable to healing would supervene. The desired reduction of acidity was accomplished mainly through the use of bland, nonstimulating diets and the use of alkalies. Occasionally the use of antacids failed to produce lowered acidity, and the immoderate and incautious increase in the amount of alkali used sometimes resulted in alkalemia. Certain factors of importance in the causation of ulcer and others relative to its treatment have been considered in some detail, since in order to attempt evaluation of any type of treatment it is essential to know in what way such treatment can hope to counteract the mechanism that causes such a lesion. If it were possible in some way to control by treatment the mechanism of aggression inherent in acid-pepsin and, at the same time, to heighten the defense mechanism inherent in tissues, it would undoubtedly be possible to treat ulcer more successfully.

It has been assumed that the use of alkalies to control gastric acidity was an unnatural way of diminishing the potentiality for erosion of the gastric juice. It was felt that if it were possible to utilize means more closely resembling those used in the physiologic method of accomplishing this, better results might be expected. It has been suggested that gastric mucus seems, in part at least, to be nature's own diluent for reducing acidity.

About four years ago Fogelson prepared mucin from the mucosa of hogs' stomachs and began using it for the treatment of peptic ulcer. He suggested that it was an ideal antacid because it combined readily with the free acid, it was a natural substance which normally had a protective, soothing, and lubricating effect on mucous membranes, and its secretion or ingestion caused no chemical disturbance in the body and no unfavorable effect on gastro-intestinal secretory or motor activity. Fogelson promptly reported favorable results in the treatment of peptic ulcer and attributed improvement to two factors: "the mucin coated the ulcer and protected it against the proteolytic action of the gastric secretion; through its high combining power with free acid it united with enough hydrochloric acid not only to neutralize the corrosive action of the gastric juice but to prolong the rate of dialysis of pepsin through the protective mucin layer."

Corroborative evidence of the efficiency of mucin in the treatment of peptic ulcer was supplied by the experience of Atkinson, Brown,

Cromer, Jenkinson, and Gilbert. Smithies and others, however, reported observations that were markedly at variance with the favorable results obtained by the advocates of this treatment.

Experience with animal mucin in the treatment of peptic ulcer at The Mayo Clinic, although encouraging in some instances, still left the workers there unconvinced that it is a cure for the disease. It seems, however, to be a step in the right direction. In the last year there have been added to the armamentarium of those treating ulcer various vegetable mucilages. One of these is okrin. Vegemucene (The BioVegetin Products Company) and "concentrated mucin" (G. D. Searle and Company) are others.

Jones, Ivy, and Atkinson reported some favorable results obtained in the treatment of peptic ulcer with okrin. This material is a mucilaginous substance made from the pods of the okra plant. The authors expressed the belief that its value might have been due to its viscosity and demulcent properties, which enabled it to protect the ulcer from chemical and mechanical irritation. In addition, they said, it might have influenced the synthesis of mucus by mucous membranes because it contained the necessary building stones of mucin, chiefly glycuronic acid (glucuronic acid).

Vegemucene is a dehydrated okra powder. Meyer, Seidmon, and Necheles used this substance and reported some very encouraging results. They were unable to find any favorable acid response in the stomach of man, but they suggested that it decreased the emptying time of the stomach. In a number of instances they noted an actual increase of acidity and suggested that this might be due to the stimulus of some histamine-like substance found in the therapeutic preparation. They were of the opinion that vegemucene was useful in the treatment of peptic ulcer. The manufacturers stated that, since vegetable mucin absorbs hydrochloric acid rather effectively, the acid which is secreted in response to the ingestion of vegemucene is again rapidly absorbed by this substance and promptly passed out of the stomach into the intestine with some increase in rapidity. Furthermore, it was assumed that the use of this powder protects, to a certain degree, the ulcerating area against the mechanism of aggression inherent in the acid chyme. Concentrated mucin, the product of the other manufacturer named, is another mucilaginous substance which has a high degree of viscosity. Its usefulness would depend on characteristics similar to those of vegemucene.

The manufacturers of both products have furnished investigators of The Mayo Clinic with liberal amounts of their mucilaginous products. They have been used in about twenty cases. Although there appears to be some symptomatic improvement in some of these cases, the investi-

gators mentioned feel that the use of these substances is still definitely in the experimental stage. They can see no specific advantage in these products over the gastric mucin introduced by Fogelson and Ivy. The taste may be somewhat more agreeable, however, and the products undoubtedly can be made at less expense to the patient than is entailed by gastric mucin.

It is difficult to reconcile the use of these substances with the requirements for treatment of peptic ulcer. So far as a marked decrease in gastric acidity is concerned, neither animal nor vegetable mucilage seem to accomplish this with any degree of efficiency. Whether it is possible in some mechanical or chemical way to heighten the defense mechanism inherent in gastroduodenal tissues is still uncertain. If it can be demonstrated that this actually is accomplished, these therapeutic agents would be welcomed as definite additions to the present methods of treating peptic ulcer. It is suggested that mucin may in some way "get between" the acid-pepsin and the tissues and thus to a certain extent protect such tissues. In the use of substances such as mucin and, perhaps, vegetable mucin, there is possibly the nucleus of a type of treatment that has definite use in the treatment of peptic ulcer. However, at present, these substances offer little if any improvement over the other approved methods.

A. B. RIVERS, M.D.

The Minnesota Academy of Science

The rebirth of the Minnesota Academy of Science occurred a year ago and that the resuscitation of the organization will prove permanent was manifest by the attendance of more than 200 at the second annual meeting held in Rochester, Minnesota, on April 21, 1934.

The Minnesota Academy of Science was first organized in January, 1873, and its beginning and life were greatly influenced by the scientific enthusiasm of Newton H. Winchell, who came to the University of Minnesota in 1872. With his death in 1914 and the disturbing influence of the World War the organization's life was at low ebb until 1929, when it was formally dissolved and its property turned over to the Minneapolis Public Library.

After several informal meetings for the discussion of the advisability of reviving the Academy to meet the need of a state-wide organization devoted to the broad field of science and composed of individuals interested in the various phases of science, the Minnesota Academy of Science was re-organized in November, 1932, with Dr. W. A. Riley of the University of Minnesota as president. The first meeting was held at the University on April 13, 1933.

There are a number of members of the medi-

cal profession who are interested in a broader field of science than that included in medicine and have shown their interest by joining this organization. There are doubtless others who would be interested in following their example.

Medical science had a prominent part in the Rochester program last month when Dr. T. B. Magath of The Mayo Clinic was elected president and Dr. Walter Kenyon of Hamline University, vice president. Dr. H. K. Wilson of the University of Minnesota was re-elected secretary-treasurer and applications for membership may be addressed to him.

Ovarian Treatment of Hemophilia Questionable

Largely as a result of the work of Birch which appeared in 1931 and 1932 the profession was led to believe that ovarian preparations are of great value in the treatment of hemophilia.

The explanation of the fact that hemophilia occurs only in the male sex led to the conjecture that something possessed by the female and not by the male might explain this peculiar fact. The ovary was the natural conjecture. Thirty years ago a favorable report of the value of ovarian therapy in the treatment of hemophilia appeared and Birch's report of the finding of estrogenic substance in the urine of normal males and not in that of hemophiliacs and the reduction of the coagulation time of the blood in hemophiliacs by the use of ovarian preparations seemed conclusive.

Attention was called to the value of ovarian preparations in the treatment of hemophilia in an editorial entitled Ovarian Extracts and Hemophilia which appeared in our February, 1933, journal. Soon a futile attempt was made by the writer to treat a patient with hemophilia with ovarian preparations. The failure was attributed to the small doses necessitated by the expense involved.

The recent report by Boston investigators* of the treatment of seven cases of proven hemophilia with large doses of ovarian substance both orally and parenterally over comparatively long periods of time without demonstrable shortening of the clotting time in a single case is therefore of interest. In five of the cases they found estrogenic substances in the urine in greater amounts than in normal males.

At the recent meeting of the College of Physicians Birch demonstrated a group of hemophiliac patients, some of whom did not respond to ovarian treatment even in her hands. The rôle played by estrogenic substances in relation to cause and treatment of hemophilia is apparently still undetermined.

*Statson, R. P., Forkner, C. E., Chew, W. B., and Rich, M. L.: Negative effects of prolonged administration of ovarian substances in hemophilia. *Jour. Am. Med. Assn.*, 102:1122 (April 7), 1934.

OF GENERAL INTEREST

The Northern Minnesota Medical Association will meet at Brainerd this year, the dates chosen being September 10 and 11.

Dr. Fred A. Erb of Minneapolis was recently re-elected president of the Hennepin County Tuberculosis Association.

Mr. and Mrs. Irving W. Quinlen of Minneapolis have announced the marriage of their daughter, Dorothy, to Dr. William Donald Graham, of Hanska, Minnesota, which occurred Saturday, April 7, 1934.

All physicians residing and practicing in Waseca County are members of the county and state medical associations according to Dr. C. R. Chadbourne, Janesville, Minn., secretary of the Waseca County Medical Society.

SAMUEL D. GROSS PRIZE

The Philadelphia Academy of Surgery announces that the Samuel D. Gross prize of \$1,500.00 will be awarded for the best original essay, not to exceed one hundred and fifty printed pages, founded upon original investigations in the field of surgical pathology or surgical practice.

Essays must be submitted before January 1, 1935, to the Trustees of the Samuel D. Gross Prize of the Philadelphia Academy of Surgery, care of College of Physicians, 19 South 22nd Street, Philadelphia, Pa.

A. M. A. GOLFERS

The American Medical Golfers Association will hold its twentieth annual tournament at the Mayfield Country Club, Cleveland, Ohio, Monday, June 11, 1934. Fifty trophies and prizes will be offered in the eight events which include low gross and net scores for 18 and 36 holes. All male Fellows of the American Medical Association are eligible and are cordially invited to join and compete. Application blanks may be obtained from Bill Burns, Executive Secretary, 4421 Woodward Avenue, Detroit, Michigan.

VENEREAL DISEASE INFORMATION

For a number of years the U. S. Public Health Service has been publishing, for the information of physicians, health officers, and others, a monthly abstract journal known as "Venereal Disease Information." This publication contains usually one original article on a subject of general interest in connection with the venereal diseases and numerous abstracts from the current literature pertaining to these diseases. In the preparation of this abstract journal more than 350 of the leading medical journals of the world are reviewed and abstracts made of the articles on the subject.

The cost of "Venereal Disease Information" is only fifty cents per annum, payable in advance to the Superintendent of Documents, Government Printing Office, Washington, D. C. It is desired to remind the reader that this nominal charge represents only a very small portion of the total expense of preparation, the journal being a contribution of the Public Health Service in its program with State and local health departments directed against the venereal diseases.

President's Letter

Public Health Education



AT a recent meeting of the Committee on Public Health Education, one of our older and most respected members expressed the opinion that it was a great mistake to tell the public too much about symptoms—that the public should have such confidence in their physicians that they would come to them for advice when they felt that anything was wrong. That to discuss, publicly, abnormal discharges from the human body in connection with the subject of cancer, would tend to create a cancer phobia which would be very unfortunate.

At the same meeting, Dr. J. A. Myers stated, "We shall continue to tell the public what we feel they ought to know about tuberculosis."

In the words of a well known American, "Let's examine the record."

When I was legally entitled to practice medicine thirty-three years ago, it was a debated question whether or not we should tell a patient who had tuberculosis that the disease existed. If we told him, it might cause worry.

The wonderful record of accomplishment in the fight on tuberculosis—reducing the death rate from first place in 1900 to sixth place in 1930—confirms the wisdom of the policy as voiced by Dr. Myers, "We shall continue to tell the public what we feel they ought to know about tuberculosis."

The leaders in this fight had first to educate physicians and then the public.

Our cancer situation today bears a marked resemblance to the tuberculosis situation in 1900. That the medical men are interested in the cancer problem is proved by the recent two-day post-graduate course at the University. One-half of the subjects discussed concerned cancer. The registration was 128—more than three times that of any previous similar course. Cancer meetings are being conducted throughout the state in various county society meetings. Cancer talks are on the air. The Speakers' Bureau of the Com-

mittee on Public Health Education is more effectively organized than ever before. Practically every newspaper in the state will accept news stories on medical subjects.

The days when the clergyman, the lawyer, and the physician were the only college-bred men in a community are gone. In 1800, 2 per cent of our population were professional people. In 1930 the number had increased to 5 per cent, which represented an increase of 50 per cent in ten years over the increase of the previous 100 years. We must also keep in mind the very large number of educated people who have not entered the professions.

People do their own thinking on religion and politics, and they also insist on doing their own thinking on medical matters. Although physicians are but 0.1 per cent of the population, we have a power far beyond our relative numerical strength. Due to our own inertia, too much guiding of matters pertaining to public health has been in the hands of laymen. If the mortality from heart disease is to be lowered, we must have a more universal adoption of periodic health examinations.

If the mortality from cancer is to be lowered, we must have more early diagnoses.

How is the thinking public to have any idea of the early signs of cancer unless we tell them what to look for? Are we to lose sight of the successful methods used in the fight on tuberculosis, when the ever growing spectre of cancer is abroad in our land?



President,
Minnesota State Medical Association.

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association

B. J. Branton, M. D.

W. F. Braasch, M. D., Chairman

J. C. Michael, M. D.

The aim of the Committee on Medical Economics is not merely to present the news about the social and economic relationships of medicine and the views of members of the committee on these things. It is also to give opportunity for expression of opinion on the part of the entire membership. Communications and questions relating to medical economics are invited and will be answered and given space whenever possible.

Committee on Medical Economics.

Veterans' Legislation

The President's executive orders of January 19 putting into effect a liberalization of hospital benefits offered World War and other veterans were made part of the permanent law when they were adopted in substance in the Tabor amendments to the Independent Offices bill which passed both houses of Congress over the President's veto on March 29.

The law of March 29 appears to be a little broader than the President's orders, but instructions carrying it into effect had not yet been completed by the Veterans' Administration as this was written.

General Frank T. Hines, Administrator of Veterans' Affairs, interpreted the law on April 3 in these general terms:

"Section 29 amends Section 6 of the Economy Act of March 20, 1933, as amended, by adding a proviso authorizing hospitalization or domiciliary care within the limitations of existing Veterans' Administration facilities of any veteran of any war not dishonorably discharged who is suffering from disability, disease or defect, and who is in need of hospital or domiciliary care and is unable to defray the necessary expense therefor including transportation to and from the institution. It provides that a statement under oath of the applicant as to his inability to pay for the service sought will be accepted as sufficient."

Hospitals Will Be Filled

The rehabilitation service of the Disabled American Veterans of the World War at St. Paul, in a bulletin issued April 12, declares the new law to be more liberal than any heretofore enacted and predicts that within a few months the hospitals maintained by the

Veterans' Administration will be virtually filled with non-service connected cases and the situation before the economy act, where service connected men often went without hospitalization for an actual battle disability, will be repeated. Doubt exists, the Veterans' organization notes, as to what extent this service connected load, being denied admission to its own hospitals, will be cared for in civilian hospitals at government expense. Before the economy act this was done to a considerable extent and in rare cases of emergency is being effected now.

The new law appears to these commentators to be less stringent than the old in that no insurmountable restriction exists to keep a man able to pay from accepting government hospitalization. The phrase "unable to pay" is susceptible of varied interpretations. The veterans' organizations do not believe it will keep anyone out of a government hospital providing he can find an empty bed.

Outpatient clinic service and dental service, abolished or greatly curtailed under the Economy Act, is again open to the veteran on very nearly as liberal a basis as existed before.

The Rising Price of Protection

The cost of malpractice insurance is going up—not down. That means there are too many professional damage suits. Why?

The insurance companies who specialize in this form of insurance offer several reasons:

1. Money is scarce. The Workmen's Compensation Act eliminated what had been a paying field for a certain class of unscrupulous lawyers and prompted a search for new fields. The professional damage suit has been a favorite substitute.

2. Modern developments in medicine—for example, the use of x-ray in diagnosis and treatment of all manner of disease conditions; the increasing use of physical therapy—to name only two instances of new processes that have multiplied and complicated the sources and pretexts for trouble.

Costs Patient Nothing

3. The damage suit lawyer commonly acts for the patient on a contingent basis. Therefore, it costs the patient nothing. He has everything to gain and nothing to lose when he sues the doctor.

To remedy the situation the insurance companies make these recommendations:

1. Keep absolutely accurate records of all profes-

sional services rendered so that you can establish facts whenever your professional services are questioned.

2. Avoid careless admissions of fault in any services you render or have someone else render for you.

3. *Avoid all criticism or disparagement of services rendered by others.*

Many a damage suit has its inception in the loose talk of some other member of the profession. Result: Damage to the standing of the profession itself; a serious loss of reputation to the physician in question; boost to the cost of protection for all.

4. Lower insurance limits to discourage the damage suit lawyer. Large insurance limits are said to insure the plaintiff, not the doctor. Formerly the amount of insurance protection carried by the doctor did not affect the size of the verdicts in professional damage suits. Of late years the indemnity form of contract, regardless of its wording, has been construed as a liability contract. The plaintiff can now recover whatever amount of insurance the doctor carries, even though what he actually has, subject to execution otherwise, represents a much lesser amount. The lower the insurance limit, the smaller the temptation for unwarranted damage suits.

Prefer Members

Insurance companies prefer to deal with men who are members of their county medical societies. These men are less likely to be guilty of petty malice and envy. They are more careful of the reputation of their profession and their colleagues.

The best companies refuse to write insurance for any but members of organized medicine.

Nowadays they are not anxious to write insurance for any but city practitioners. There, organization is strongest.

What is your experience with damage suits and with insurance protection against them?

Write this department about it. This is an important matter for the doctor. Obviously something is wrong. Maybe you can contribute a satisfactory solution.

Copeland (Tugwell) Bill

Senator Copeland's bill, S. 2800, which is a substitute for his earlier bills, S. 2000 and S. 1944, and provides a sweeping revision of the food and drugs legislation, was still waiting its day on the floor of the Senate as this was written. On March 29 it was passed over, indications being that a protracted argument is to be expected when the Senate finds a convenient day. The bill was reported out by the Senate Commerce Committee on March 15 with amendments considerably toning down its restrictions on fraudulent advertising and in other particulars.

By Dr. Wiley

It will supplant the present Pure Food and Drugs Act which became a law (its field of application being limited to interstate shipment of foods and drugs) some twenty-seven years ago, in 1908. That original

bill, brought into existence largely by the efforts of the late Dr. Harvey W. Wiley, has for a quarter of a century been the only Federal bulwark against the sale of impure and dangerous drugs and foods. The present bill proposes to re-write and adapt it to the needs of the present day. That, of course, means that its provisions must also cover advertising by means of newspapers and magazines and radio, as well as manufacturing, labelling and shipping.

Organized Opposition

The opposition to the bill in all its stages has been varied and bitter, as might be expected. It has made allies of drug and cosmetic manufacturers, advertising agencies and newspaper publishers.

It is to be hoped that changes made will not entirely frustrate the objects of the bill, which include the following:

1. Prevention of false advertising of foods, drugs, cosmetics.
2. Prevention of traffic in poisonous cosmetics.
3. Establishment of safe tolerances for added poisons in food.
4. Establishment of legally binding definitions and standards for foods.
5. Power to require permits for manufacturers of potentially dangerous products when the public cannot otherwise be safeguarded.
6. Prevention of curative claims for drugs when such claims are contrary to the general agreement of medical opinion.
7. Requirement for definitely informative labels for food and drugs.
8. Power to protect the public health from future products and practices which may prove dangerous.

These objectives have the support and sympathy of the medical profession.

Interesting Sidelight

From the hearings of the Committee on Commerce, United States Senate, on the bill.

F. L. Rogers (representing the Terpezone Company): Yes, Sir. The man who uses the word "cure" in connection with TB ought to be hanged. It depends entirely on the progress of the case. It is a most difficult thing to merchandise, the most difficult thing to talk about, but I would not sleep nights unless I came down here to bring the attention of this committee to the passage of a bill that would prevent this (Terpezone) being used in whooping cough, typhoid, measles and pneumonia. This vapor could have been going in this room and we enjoying it, and pneumococcus, staphylococcus, streptococcus—there isn't a germ known that would live in this room two and one-half hours.

Senator Copeland: Well, we ought to get some right away. . . .

Mr. Rogers: This thing has been a romance of business from the start. There has been more fight for control, as they mention in the New York paper, than

any business I ever saw. Now, Doctor, we would not sell the machine to an osteopath or a chiropractor for over twenty years; and, Doctor, Terpezone did not become successful or well known until they let the bars down, if you may call it that, and sold these machines to doctors in all branches of the profession, and people now pay (I can mention any number of cities) to come and sit in the room in which this air is germinated. I would like, particularly, to mention the part of the bill that stirs us up. We do not care if you call us a drug, or any other classification, but if we go to jail because we tell somebody it (Terpezone) is helpful in sinusitis for which there is no specific now, and we claim that Terpezone is a specific for sinusitis—I don't know what we are coming to and I might mention TB and sinus trouble, pneumonia.

When Nicholas Longworth died, it was hard to keep from telephoning; but you have been through that. You know how hard it is to get to a board of doctors and convince each and every one of them that it is a good thing. When Melvin Traylor died in Chicago the other day we sent a notice that Terpezone kills the Friedlander bacillus in four hours, a heavy encapsulated germ.

Now, right on that part of the bill, how is it humanly possible to show how long that same vapor will require to kill the germs in the body except through tests?

We know that sputum is rendered negative of tubercle bacillus over a length of time, but the Lord only knows how long.

Senator Copeland: No, your trouble is not with that section. It is with the section that prohibits self medication or advertising for self medication. . . .

Mr. Rogers: I do think that if we sent through the mail, comments by physicians, members of the medical association who are using this—and they use it at their peril—it will be a public nuisance under this act, and if we even intimate in there that this is good for sinusitis or TB or pneumonia, I suppose it means jail.

For Public Health Education

All sub-committees and "liaison" sub-committees of the Public Health Education Committee foregathered at a dinner meeting at the Men's Union at the University of Minnesota, Tuesday, March 27. Members showed a lively interest in public health education projects and policies of the committee.

The two-day post-graduate course arranged by the University Extension Division and the Minnesota State Medical Association had come to an end on the campus that afternoon.

The following considerations and suggestions were urged by the various sub-committee chairmen and others at this meeting:

1. That every county society organize a public health or public relations committee to deal, as representative of the society, with all welfare groups.
2. That, in the face of legislative strides made else-

where by cultists and quacks, there be no relaxation in the effort to educate legislators, protect the public and the medical profession. (Dr. C. B. Wright, Minneapolis, Trustee of American Medical Association.)

Quotation from legislative résumé by Dr. W. C. Woodward, Director of the Bureau of Legal Medicine, American Medical Association:

"The cults scored heavily against public health interests in 1933. Independent chiropractic examining and licensing boards were created for the first time in Colorado and Michigan, and the chiropractic acts in Montana, New Mexico, North Carolina, and North Dakota were amended so as to enlarge the scope of chiropractic practice. Osteopaths were granted enlarged rights in New Mexico and North Dakota and, but for the courageous and intelligent use of the veto power, they would have been granted unlimited rights in Michigan. A naturopathic practice act conferring on the naturopath an independent status would now be a law in Arizona but for the Governor's veto. Why cult legislation of this character should be so successful is a question calling for searching inquiry by state organizations."

3. That education to protect the public against charlatans and quacks should begin with adequate scientific instruction in the high school years. (Dr. J. A. Watson, Minneapolis, Minnesota Editorial Association Committee.)

4. That the weekly news service prepared and sponsored by the committee is valuable. The example was cited of a little girl who read one of the stories warning against taking laxatives for stomach pain and acted upon the advice in the presence of an acute appendicitis. The Public Health Education Committee releases now reach 470 newspapers in the state through the offices of the Minnesota Editorial Association. (Dr. H. F. Helmholz, Rochester, chairman, Editorial Sub-committee.)

5. That the committee's Speakers' Bureau is in process of reorganization. More speakers for lay groups must be developed in all parts of the state. Lists of material available for such speakers in the Speakers' Library, at state headquarters, are to be put in the hands of all county secretaries. A course of health lectures is to be offered to colleges and normal schools by the committee. Speakers should be paid something in excess of expenses, depending upon the time and inconvenience entailed in making talks. (Dr. F. H. Magney, Duluth, chairman, Speakers' Bureau Sub-committee.)

Begins With Doctor

6. That cancer education must *begin with the doctor with the object of shortening delay between diagnosis and treatment*. The public must be educated as to suspicious signs and taught to consult a physician as soon

as they appear. (Dr. Martin Nordland, Minneapolis, chairman, Liaison Cancer Sub-committee.)

7. That the periodic health examination is the best means of finding heart conditions. Public health teaching should make a special plea for the periodic examination. (Dr. A. A. Passer, Olivia, chairman, Liaison Heart Sub-committee.)

8. That physicians should cooperate closely with lay groups to carry out legitimate public health programs. It is especially important that they act on local committees directing activities of government relief nursing and malnutrition projects. (Dr. E. S. Boleyn, Stillwater, chairman, Liaison Public Health Nursing Sub-committee.)

9. That the immunization measures to be recommended for every child must still be limited to diphtheria immunization and vaccination against smallpox. Immunization against scarlet fever is still in the experimental stage, likewise immunization against whooping cough. Antitoxins for diphtheria and scarlet fever should be given immediately on first clinical evidence of the disease; they should not wait for laboratory evidence. Both are most effective in the early stages, preferably the first 24 hours. Convalescent or normal serum or whole blood should be given to children under three or four years of age, who have been exposed to measles. They should be given between the third and fourth days after exposure to mitigate severity of disease (Dr. Helmholz.)

10. That, for purposes of public policy, particularly dealing with lay groups who are interesting themselves in the subject currently, our attitude on education with regard to birth control should be that it can safely be left in the hands of the family physician. Any aspects of the problem which cannot be handled by the family doctor constitute a social, not a medical problem. The same applies to eugenic sterilization. (Dr. L. R. Critchfield, Saint Paul.)

Re-education Clinics

11. That the orthopedic clinics sponsored by the State Department of Rehabilitation, the Christmas Seal Organization and the Orthopedic Club, now proposed in six Minnesota communities, are largely for the purpose of determining re-education needs. They have the backing of a strong state department, well supplied with funds; they also have the backing of unusual public interest in cripples. Lay groups will find it difficult to understand any opposition to these clinics on the part of medical men. (Dr. E. A. Meyerding, Saint Paul, secretary of the Minnesota State Medical Association.)

12. That *Everybody's Health*, published by the Minnesota Public Health Association, is a valuable aid to lay health education and should be sent to all physicians in the state; that tuberculosis surveys including Mantoux test and x-ray for school children are the most effective means of public health education in tuberculosis. Also they leave valuable information and technic in the hands of the local medical profession. The latter participates in the work and is enabled to carry it on when the survey is finished. The modern

problem in tuberculosis is to find the early case before it presents clinical symptoms of disease. (Dr. J. A. Myers, Minneapolis, chairman, Tuberculosis Sub-committee.)

13. That the effectiveness of the campaign of lay education about tuberculosis in the last twenty-five years is an example of what can be done with a similar campaign about cancer. One hundred and twenty-eight men registered for the post-graduate course in cancer at the University of Minnesota. (It ended on the day of the committee meeting.) The Women's Auxiliary could be a valuable aid in public health education. (Dr. F. J. Savage, Saint Paul, President of the Minnesota State Medical Association.)

14. That local physicians participated from the start in plans for federal nursing and malnutrition surveys in Willmar and Kandiyohi County. Every member, in good standing, of the county medical society, became a member of the advisory board working with the Kiwanis and other lay groups. The result was highly satisfactory to everybody with an effective, legitimate program underway. (Dr. B. J. Branton, Willmar, Public Health Education Committee.)

15. That the state office maintain contact with all lay welfare organizations such as the parent-teachers associations, women's federated clubs, the Postmasters Association, the American Legion and its auxiliary, etc. Any local difficulties with these groups should be settled through the state office to avoid friction and embarrassment. In his dealing with lay welfare groups of all sorts, the physician must remember that his education and experience are essential to all. With this asset used with study and good judgment, he can hold public good will. (Dr. Meyerding.)

Medicine and Public Health

Minneapolis Plan Leaves Treatment to Physicians

Dr. F. E. Harrington, Health Commissioner of Minneapolis, thus crystallized the policy and program of his department in Minneapolis:

"The Minneapolis Health Department is not here to do the things that physicians should do.

"The department does not *treat* disease."

There was a time when seven physicians were employed by the Minneapolis department to confirm all diagnoses on communicable disease. Nowadays the health department does not make any diagnosis whatsoever in these cases. The department merely quarantines. It is left to the physician to diagnose. When suspicious cases are reported, the department quarantines and then waits for a final diagnosis from the attending family physician or, if there is no family physician, from physicians of the public dispensaries.

The same policy is followed with regard to immunization and vaccination.

No Immunizations

The Minneapolis Health Department does no immunization, performs no vaccinations—with one exception. If an epidemic of smallpox or diphtheria should break out in a slum district where it would be impossible

to send the residents, with any promptness, to private physicians or dispensaries, the department would then proceed to vaccinate.

In the schools, where school physicians and nurses carry on a constant campaign for immunization and vaccination, children are referred, as far as possible, to their own physicians. If a private physician seems to be out of the question, they are referred to the dispensaries.

Defects found by school nurses and physicians among school children are likewise referred to the physician for correction. The Health Department makes no corrections.

What does the department do outside of the routine of enforcement of sanitary regulations and quarantine?

Diagnostic Clinics

1. It employs eleven physicians who spend their mornings examining school children for defects. When defects are found, the children, in every case, are referred to their family physicians.

2. It conducts clinics for diagnosis.

One is an ear clinic established for charity cases alone. Children found in routine examination with hearing defects are sent for further examination to this clinic, which in turn sends cases needing more tests to the University clinic.

A similar clinic is conducted for eye cases among charity patients. This clinic, too, is merely for diagnosis. There is a fund contributed by the Junior Red Cross, however, to pay for glasses for these children.

An orthopedic clinic is also maintained for charity cases. This clinic refers patients to the hospitals for crippled children and also for special education in the schools for crippled children. Like the others it is not a treatment clinic.

There is one exception; that is the skin clinic.

For Minor Afflictions

Most physicians prefer not to be bothered with minor skin afflictions. Accordingly, this clinic was established to clear all cases of skin trouble before they could be taken back to school; it also treats such troubles as seem too trifling to refer to a physician.

The venereal disease clinic is likewise a diagnostic clinic maintained in connection with the court. A physician is employed for treating the disease at the workhouse, however.

Tuberculosis work in the city is carried on under the same plan. The clinic at Lymanhurst school, for example, is purely diagnostic. The child who is found to have tuberculosis, or to be infected, is referred at once to his family physician for treatment.

Since 1920, thousands of public and private school children have been referred to their own physicians for correction of physical defects, for treatment, for immunization and vaccination.

Result: Minneapolis has an excellent morbidity report.

The Hennepin County Medical Society and the Health Department work together with increasing efficiency and friendliness. Any plan which the medical men may make to care for the indigent in their offices instead of in the dispensaries will have the hearty co-operation of the health department.

Hennepin County Medical Society Cooperates With Minneapolis Division of Public Health

Following is a brief résumé of a plan for public health work by a county medical society that worked to the satisfaction of all concerned and also yielded a profit to the treasury of the county society.

On June 3, 1933, an agreement was made between the Hennepin County Medical Society and the Division of Health by which as many adults and children as might apply to the city for vaccination or inoculation against diphtheria would be cared for by physicians in their offices. The Division of Health agreed to pay 50 cents for each individual who was unable to pay himself, for the service; also to furnish vaccine and toxoid without charge. The money thus earned by the physicians was to be turned into a county society fund.

The agreement was intended to terminate December 31, 1933, and a sum of \$10,000 was set aside by the Board of Public Welfare to pay for free services rendered to these patients. Unfortunately, the plan had to be called off before December because of the necessity for transferring all funds to hospital maintenance.

Two hundred and ten physicians returned signed agreements to assist in the work as a result of the letter sent out by Dr. C. A. Stewart, chairman of the Hennepin County committee on vaccination.

All cases, private and free, were to be reported to the Commissioner of Health. Inability to pay was noted on a card over the signature of a responsible member of the family.

Minneapolis newspapers coöperated heartily in a public campaign to get people to their doctors for these services. A few objectors protested, as was to be expected, in the "Public Pulse," public expression column in the newspaper.

The amount of money taken in for services to private patients was not reported. But a total of \$4,937, less \$115.50 for expenses incurred, had been earned by the 210 members at the time the program was called off.

The money was placed under the guardianship of the Board of Trustees of the society and it was specified that the income be used at the discretion of the Board for the relief of any member in financial distress. It is interesting to note in the record that one physician took care of 250 patients without charge, under the terms of the agreement.

Only one regret was voiced after the termination of the plan: that the original agreement should not have been completed. Only a part of the deserving patients had been reached during the short period allotted.

Doctors and Nurses

Here and there, in the last few years, there have been disagreements between doctors and public health nurses; sometimes the fault of one, sometimes of the other.

There have been misunderstandings, also, as to the rôle of the practicing physician and county medical society in community health programs. The fault in this case has been, in the opinion of the Committee on Public Health Nursing, of which E. S. Boleyn of Stillwater is chairman, as much that of the doctors as of the interested nurses and lay leaders. Too often medical men have failed to take an active part in these local welfare projects. They have neglected to assume the leadership that would willingly have been yielded to them; and when things went badly, they have contented themselves with mere complaints and expressions of disapproval and resentment.

The following statement prepared by the chairman of the Committee on Public Health Nursing covers this situation and is recommended especially to the attention of men in the smaller communities where difficulties are most often reported.

The Relationship of the Family Doctor to the Public Health Nurse (County or State)

1. The public health nurse functions to promote the health of the community. In this function she is participating in the practice of medicine, although necessarily in a capacity that is subsidiary and supplemental to that of the licensed medical man. He, alone, is qualified, by reason of education and experience, to direct the work.

Any work that is done in connection with local health programs must necessarily end in the hands of the medical man. To be really effective, it should begin with the medical man also, since no one knows as much as he knows about the health conditions and needs of the community.

2. The medical society, as a group, should stand in such a relationship to the community that the community will look to it for help and advice in the direction of group health projects such as, for instance, the employment of a public health nurse.

The county medical society, either as a body or through its representative committee, should itself outline and direct such projects, working in harmonious coöperation with interested lay persons.

3. Preventive medicine was part of the office practice of the physician until the demand arose in very recent years for mass immunization.

Immunization carries with it the same dangers that adhere to the administration of other forms of medication. As such, it should be under the supervision of the family physician, who knows his patients.

The development of mass practice was undoubtedly hastened by the rise of the public health nurse. Nevertheless, there is, today, a reaction against this inadequate form of practice. The tendency is toward

a return to the individual examination and care generally by the family physician.

Of course we should not lose sight of the fact that certain very cursory mass health inspections have a definite value. Among these are the school health inspections in which the object is merely to note obvious defects and refer them to the family physician for diagnosis and treatment.

Undoubtedly a large part of the difficulties encountered with public health nursing programs has arisen because of individual differences and misunderstandings. *The only way to settle such differences satisfactorily is to delegate a special committee from the local medical society to handle such matters.*

Valedictory

Dr. O. J. Hagen of Moorhead attended his last meeting as a member of the Council of the Minnesota State Medical Association at the Council meeting, held at Saint Cloud, October 12, 1933.

His resignation was accepted by the 1933 House of Delegates, at Rochester, after his appointment to the Board of Regents of the University of Minnesota had been announced. The following vigorous and ringing "Valedictory" was delivered by Dr. Hagen at the Saint Cloud meeting:

"Members of the Council, President of the State Medical Association:

"I salute you!

"I am here today attending my last meeting after three years of service on the Council. I wish to take this occasion of telling you how much I have enjoyed working with you. I regret that I cannot remain longer for other urgent activities in addition to my professional duties prevent it during the coming year.

"The fact that I am leaving the Board does not mean that I am not interested. It means that your work is becoming so multiple and demanding so much time, that I cannot, in addition to what I already am doing, serve the doctors of Minnesota with the distinction they deserve. The fact that I nominated and urged the election of Dr. Willard Burnap, an ex-president of the Association and a loyal worker for a decade in the cause of the profession of the state, and one who would be of greater service than I, is proof of such interest.

"But let me assure you I am going to serve unreservedly in the ranks and be grateful for the opportunity, for that is honor enough for any man.

"To be a member of the State Medical Association is to me a privilege and a distinct honor in itself. And as such I wish to pledge my best efforts to support your loyal hands, to continue to help roll with you the gatling guns of the medical association to high vantage grounds, that the Association may, through you, continue to pour murdering lead into the enemies of scientific medicine in the state, whether that enemy be the gangsters who prey upon our fellow citizens as irregular practitioners and charlatans, the anti-vivisectionists, or whether they be their paid representatives

lobbying in our legislative halls, or the Judases within our own profession.

Proud of the Council

"I am proud of the Council and its various committees who are carrying on for the doctors of this state. Your unselfish concern has not been for the big man and his organization, for you feel he can take care of himself. In every legislative struggle and in every project undertaken, it has been for a square deal for the humblest doctor in the smallest town in the state because he is a member of the profession. For his interest and cause you have fought your hearts out in a hundred battles in the last ten years and many of you have served on the Council that long. And Dr. Workman, you who have served over a quarter of a century with little thanks. Hats off to you!

"And why should I not be proud of being a member of the Minnesota Medical Association? Does it not, without qualification, represent the greatest scientific and constructive medical leadership in the Nation? Two years ago, members of this Association, upon whose council you sit, occupied the presidency of every national and affiliated medical organization in the nation, and any state would have regarded it an honor to hold the presidency of even one of these outstanding associations. There was Doctor Marx White of Minneapolis serving as president of the American College of Physicians, meeting in California. There was Dr. E. Starr Judd, serving as president of the American Medical Association meeting at Dallas, Texas. There was Paul Fesler, Superintendent of the University Hospital, serving as president of the American Hospital Association meeting at New Orleans. There was Dr. L. B. Wilson serving as president of the Association of American Medical Colleges meeting at Philadelphia. There was Dr. Melvin Henderson serving as president of the American Orthopedic Association meeting at Nashville. There was Dr. Will Mayo elected president of the American Post Graduate Assembly that year, meeting at Milwaukee, and this year presiding at Cleveland; and Dr. C. B. Wright serving as the president of the Legislative Committee of the American Medical Association, the largest and most powerful medical association in the world, and this year elevated to membership on its Board of Trustees. Every one of them is a member of the Minnesota Medical Association. Had there been any more presidencies to be filled in the nation, I am sure a Minnesotan would have been asked to fill it and he would have been capable of doing so with distinction.

Shock Troops

"This is the type of men you, as a Council, represent in this state. And add to the Council this list—the shock troops of the Association—a sovereign roll-call: The immortal Herman, sage of Dawson, Jimmy Hayes, C. B. Wright, William Braasch, N. O. Pearce, L. L. Sogge, Mr. Brist, Melvin Henderson, and last but not least, E. A. Meyerding, the secretary—every one standing ready as advisory members.

It has been my privilege and responsibility to sit upon many Boards in Minnesota in the last quarter of a century—the State Board of Health, Governor Eber-

hart's so-called Efficiency Commission, for eight years a member of the State Teachers' College Board, and for the last three years a member of the University Board of Regents. With due respect and regard for the outstanding men of this State who have served on these Boards, I wish to say here and now that for efficiency, interest, fidelity and grasp of the job to be done, the Council of the State Medical Association stands without a peer. Alert to sense every adverse current which might affect, detrimentally, the medical profession and undermine its guild spirit; inspired to promote the scientific advance of its individual members; watchful to fight the inroads of cultists and charlatans; interested in every member whether in the big cities or without, you and your legislative committee have stood upon the outposts as true soldiers and fought a good battle on every front, undismayed and unafraid.

"I leave you as a member of the Council and I go to the ranks. I know the temple of medicine will be in safe hands and as a humble, practicing physician I can feel secure because you will be fighting unrelentingly and unselfishly, giving your time and strength to serve the profession throughout the state and nation."

Cleveland Dispensary Plan Reports

In 1932, Cleveland welfare agencies and dispensaries and a committee of the Cleveland Academy of Medicine put into operation a new plan for dispensary admissions by which dispensary patients were to be referred by welfare workers to private physicians.

Those who, at some time or other, had been under the care of a private physician were referred back to that physician. Others who were or who might ultimately be able to pay were referred to a neighborhood physician picked from a list compiled by the Academy of Medicine.

The physician thus picked was to treat the patient for such a fee as he and the patient might agree on or he was to treat him free or on a deferred payment basis. Or he was to refer him to a dispensary.

Studies made at the end of one year of operation showed:

One hundred and seventy-two physicians wanted the plan continued; seventy-two did not.

Eight dispensaries wanted the plan continued; one did not.

Twenty-three agency workers wanted the plan continued; three did not.

Among the conclusions drawn was this one: The plan is succeeding in returning to private practice about 25 per cent of the patients referred out. Probably 50 per cent are ultimately returned to the dispensary out-patient departments.

There has been a definite improvement of the relations between dispensaries and private practice and between field workers and private physicians. Verbal reports from several hospital superintendents indicate that the number of complaints against the hospitals for alleged interference in private practice have decreased remarkably.

Picture Book

What do you want to know about costs of medical care?

Ask the Julius Rosenwald Fund in Chicago.

There is information to be had, there, suited to all ages and all conditions. Example: The booklet called "A Picture Book About Costs of Medical Care" recently distributed widely, together with a selected reading list on the subject. The picture book was designed and published by the Fund to fill "the demand for information in popular form concerning costs of medical care and ways of making good medical service more fully available to the people." It offers a series of striking graphic representations of distribution of costs and income, distribution of sickness and of medical services.

Following are the groups and classes for whom the Julius Rosenwald Fund is ready to send out study material:

1. Individuals, classes and committees studying the subject.
2. Local and national organizations which are arranging meetings or conferences for its discussion.
3. Professional and lay agencies which are undertaking or considering practical experiments aimed at meeting existing needs.

* Judging by the above classifications, the doctors and dentists who are actively engaged in delivery of medical and dental services are of no great importance among the "agencies who are considering practical experiments aimed at meeting existing needs." Neither their opinions nor their "education" are to be considered.

The Picture Book contains the same fallacies that were used as a basis for the Majority Report of the Committee on Cost of Medical Care and subsequent propaganda. Physicians will meet with them often. They should study them well.

Not a Member

If scarcity of complaints from the State Board of Control and its subsidiary units in charge of all branches of federal relief work in Minnesota is an indication, Minnesota physicians have worked well to care for relief beneficiaries in this state.

The case of two men registered at a transient camp in western Minnesota brought to the attention of Dr. F. J. Savage, president of the Minnesota State Medical Association, this month, may constitute an exception. The two men were sent to a physician for examination and declared that they were not examined according to the instruction. Oscar W. Behrens, director of State Transient and Homeless Relief Activities, refused to pay the physician's bill and instructed the local superintendent to send no one else to him.

The physician is not a member of his medical society, but the local medical society and the councilor for the district are investigating.

Surgeon General's Library

The War Department's Appropriation Bill, H. R. 8471, passed the House of Representatives and is now before Committee on Appropriations in the Senate.

This bill carries an appropriation for the Library of the Surgeon General's Office that is \$5,000 less than at any time since 1926. That means that the efficiency of this famous library, already materially reduced, will be seriously crippled this year.

Physicians everywhere, to whom this institution is of inestimable value, have been urged by Dr. W. C. Woodward, director of the Bureau of Legal Medicine of the American Medical Association, to do what they can to urge upon the Senate Committee on Appropriations the importance of maintaining the library.

Russell D. Carman Lectureship

One of the most interesting advance announcements made, so far, in connection with the 81st Annual Meeting of the Minnesota State Medical Association, to be held in Duluth, July 16, 17 and 18, concerns the new Russell D. Carman Memorial Lectureship, established by the Minnesota Radiological Society.

This lectureship provides for a lecture to be given each year at Minnesota's annual meeting by a prominent radiologist, the first being Dr. A. B. Moore, of Washington, D. C., who will talk before a general assembly on Monday, July 16.

Only one other lectureship is available to the program of the annual meeting: The Citizens' Aid Society Memorial Lectureship on Cancer, which has brought several distinguished speakers on cancer to Minnesota, among them Dr. George Gray Ward, Jr., and Dr. James Ewing of New York.

The addition of the Russell D. Carman Lectureship is a very happy event for the state meeting. It constitutes a precedent which other societies may well be urged to follow.

New County Society

The Renville County Medical Society elected officers and started to shape its individual destinies April 3 at Olivia.

Last February the society voted to detach itself from the Camp Release District Society (comprising also Chippewa, Lac qui Parle, Sibley and Yellow Medicine), so as to form a convenient county unit, notably for entering into negotiations with County Commissioners for medical care of the indigent; for a joint credit and collection arrangement.

Four reasons for the change are cited by Renville County officers. They are:

1. Changes in methods of transportation. Camp Release Society was laid out along two railroads. The highway system has changed all that, making an entirely different natural grouping.

2. The increasingly large number of people unable

to pay for their medical services makes it necessary for the physicians of each county to come to some definite arrangement with their own county officials.

3. The original district covered a territory too large to work as a unit for any credit or collection arrangement.

4. The same applies also for organization for extension lectures and for attendance at regular meetings of the society.

The new society has a membership of seventeen. Dr. W. A. Brand, Redwood Falls, is president; Dr. R. S. Madland, Fairfax, is vice president, and Dr. J. Dordal, Sacred Heart, is secretary-treasurer.

Minnesota State Board of Medical Examiners

Mankato Physician Sentenced to Stillwater

State of Minnesota vs. Arthur W. Eckstein, M.D.

Dr. Arthur W. Eckstein, forty-six years of age, and licensed to practice medicine in the State of Minnesota, was sentenced to two years at hard labor in the State Penitentiary at Stillwater, on Saturday, March 31, 1934, by the Honorable Harry A. Johnson, Judge of the District Court at Mankato. Dr. Eckstein entered a plea of guilty to a charge of criminal abortion on a nineteen-year-old farm girl.

Dr. Eckstein appeared before the Minnesota State Board of Medical Examiners in 1932 on a similar charge, at which time he was censured and warned as to the consequences in the event that he had any similar trouble in the future. Apparently the warning was in vain, for the records indicate that Dr. Eckstein performed a number of abortions subsequent to his appearance before the Board. In addition to his two-year sentence at Stillwater, which he is now serving, Dr. Eckstein will have to show cause before the State Board of Medical Examiners, on May 8 next, why his license to practice medicine should not be revoked.

Licensed Masseur Pleads Guilty to Violating Basic Science Law

State of Minnesota vs. Otto S. Paulson, Masseur

Otto S. Paulson, fifty-five years of age, of Echo, Minnesota, who holds a license to practice massage in the State of Minnesota, entered a plea of guilty to practicing healing without a Basic Science Certificate on April 11, 1934, before the Honorable Harold Baker, Judge of the District Court at Renville, Minnesota. For some time complaints have been received by the State Board of Medical Examiners that Paulson was not confining his practice to that of massage, but was practicing healing in a substantial way. Although Court was not regularly in session, Judge Baker agreed to accept the defendant's plea of guilty at Renville, Min-

nesota, and after the matter was presented to the Court, the defendant was sentenced to six months in the county jail of Yellow Medicine County, which sentence was suspended pending the good behavior of the defendant. It will be necessary for Paulson to comply with all the laws of the State of Minnesota, and particularly those regulating the practice of healing. He is also to report to the Court on the opening day of the September term at Granite Falls. The Court has requested that it be advised at that time of the manner in which the defendant has conducted his practice as a masseur in the meanwhile. Paulson was very liberal in advertising his ability to prospective patients, and there were very few ailments that he could not cure. It seems that his services were badly needed at Rochester, but he was too busy to accommodate those seeking his assistance. Much of this "atmosphere" disappeared when Paulson was arrested. He admitted quite frankly that he was going beyond his massage license and that he "perhaps" was doing a little too much talking with respect to himself and his ability. Paulson has been advised that any further complaints concerning him will result in a citation being issued for revocation of his massage license.

Splendid coöperation was shown in this case by Mr. Salmer M. Knutson, County Attorney of Yellow Medicine County, and Sheriff Martin F. Fitzner. The State Board of Medical Examiners also acknowledges the very considerate attitude of Judge Baker in disposing of this case at Renville without any delay.

Warning to Duluth Woman

It has come to the attention of the State Board of Medical Examiners that Mrs. Bessie Magnussen, 1311 West First Street, Duluth, who is listed in the Duluth City Directory as the pastor of the First Spiritualist Church at 18 North First Avenue West, has been giving massage treatments in connection with her spiritual healing. Mrs. Magnussen holds no license to practice medicine or massage in the State of Minnesota, neither is she registered under the Basic Science Law. Practitioners of mental or spiritual healing are exempt from the Basic Science Law only so long as their ministrations or attempts to treat are confined exclusively to mental or spiritual means. They are not permitted to practice healing in any other manner.

This matter has come to the attention of the Medical Board following the death of a Duluth woman who was afflicted with cancer and who had been going to Mrs. Magnussen for some time prior to her death. Mrs. Magnussen has been warned by F. Manley Brist, representative of the Board, to confine her practice exclusively to mental and spiritual means. The Medical Board respectfully requests that any information indicating the contrary be promptly submitted to the Board at 524 Lowry Medical Arts Building, Saint Paul, in order that the necessary action may be taken. The Board invites the coöperation of everyone concerned in this and similar cases.

OBITUARY

Dr. Knox Bacon
1864-1934

Dr. Knox Bacon died at his residence in San Diego, California, on April 7, 1934, from coronary thrombosis.

Dr. Bacon was born October 1, 1864, at Niles, Michigan, the son of Major Cyrus Bacon, Jr., Assistant Surgeon in the U. S. Army, and Arabella Knox, daughter of Colonel and Mrs. A. P. Knox.

Following the Civil War, his early childhood was spent in military posts in the south, at Fredericksburg, Galveston, and Baton Rouge, until the death of his father, when the family returned to Niles, where he remained until he came to Saint Paul in 1886.

Because of ill health, however, the years 1890 and 1891 were spent at Carlsbad and other Austrian and German resorts.

Upon his return to Saint Paul he entered the University of Minnesota, and graduated from the Medical Department with the Class of 1894. After serving an internship in St. Luke's Hospital he became associated with the late Dean Perry Millard, with whom he remained until the death of Dr. Millard.

He continued the practice of his profession in Saint Paul, with the exception of a year spent in the hospitals of Austria and Germany, until the United States entered the World War, when he served for the period of the War, with the rank of Captain. After the war he took up practice again, but because of heart trouble he was obliged to retire in 1923. To find a suitable climate he went to San Diego, where he remained until his death, with the exception of two years spent in Italy and Southern France. He was unable to practice after his break in 1923.

He married Miss Minerva Emerson in 1897. She died in 1914, and in 1915 he married Miss Frances Wagner, who, with one daughter, Dolores, survives him.

Dr. George Samuel Wattam
1865-1934

Dr. George Samuel Wattam, seventy-seven, pioneer physician of Warren, Minnesota, and a civic leader known throughout the state for the part he played in the campaign against tuberculosis, died at his home in Warren, Saturday, March 17, after a long illness.

Dr. Wattam was born in Prince Edward County, near Picton, Ontario, July 10, 1856. He was graduated from the Medical College of the University of Toronto in 1884 and went to Warren in the same year, where he practiced medicine continuously until his retirement two years ago.

With the late Dr. H. Longstreet Taylor and Dr. James L. Camp, Dr. Wattam was appointed by Governor Van Sant in 1901 to consider the advisability of establishing a state sanatorium for tuberculosis. These three physicians, after a complete investigation, made the report to the state legislature in 1903 which resulted in an appropriation for the construction of the institution at Walker. For nine years thereafter, Dr. Wattam served on the State Sanatorium Commission.

Dr. Wattam was for many years councilor for his district of the Minnesota State Medical Association, serving also as vice president of the state body. He was president for a term, likewise, of the Northern Minnesota and of the Red River Valley societies. In 1923 he was elected president of the Minnesota Sanitary Conference.

Dr. Wattam was active in organizing the Christmas Seal unit in his county and served as its president for

many years, as well as director of the Minnesota Public Health Association.

He is survived by four sons: Charles C. and William E. Wattam of Fargo; Harry E. and Kent Wattam of Flint, Michigan; and a sister, Mrs. Emily Coon, of Peterborough, Ontario.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MEDICAL BROADCAST FOR THE MONTH The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 10:30 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of May will be as follows:

- May 2—Coronary Disease.
- May 9—Crippled Children and Their Problems.
- May 16—Chickenpox.
- May 23—Twilight of Hearing.
- May 30—Blood Vessel Tumors.

STATE MEETING

The list of scientific exhibits and demonstrations in preparation for the meeting bids fair to outgrow facilities in the Duluth Hotel, according to the Committee on Scientific Assembly now engaged in arranging for space and equipment.

Outstanding on the list is the demonstration of the ambulant treatment of hernia to be conducted by Dr. A. F. Bratrud of Minneapolis. Patients will be present in all stages of treatment during demonstration hours each day of the meeting. Also an exhibit and demonstration on diagnosis and treatment of carbon monoxide poisoning will be conducted by Dr. F. J. Elias of Duluth with the assistance of equipment from the Duluth steel mills.

The United States Public Health Service will also send four exhibits and demonstrations of extraordinary current interest, including one on occupational dermatoses prepared by Senior Surgeon General Louis Schwartz of New York; another on encephalitis, based on findings and studies made during last year's epidemic in Saint Louis prepared by Surgeon General H. S. Cumming, Washington, D. C.; two others on lead poisoning and silicosis prepared by Surgeon R. H. Sayers of New York.

Others of note include the daily lectures and demonstration diets prepared by the Committee on Diabetes; several exhibits to be sent intact from the Cleveland meeting of the American Medical Association, notably the exhibit of Dr. A. J. Cramp on cosmetic dermatitis; a demonstration of the Elliott treatment by Dr. V. S. Counsellor of Rochester; demonstration of the office use of diathermy by Dr. R. L. Nelson of Duluth; a physical therapy demonstration by Dr. G. E. Knapp of Minneapolis; an exhibit on pneumonitis produced by fungus spores, prepared by Dr. J. W. Towey, superintendent of the Pinecrest Sanatorium, Powers, Mich. (Dr. Towey will also present a paper on the Tuesday program); exhibits on amebiasis by Dr. T. B. Magath; on blood dyscrasias by Dr. F. J. Heck; on brain surgery by Dr. A. W. Adson and Dr. W. McK. Craig; and on hypertension by Dr. N. M. Keith, all of the Mayo Clinic.

Demonstration hours will be at 10 a. m. Tuesday and Wednesday mornings and at 11 a. m. Monday.

Tuesday morning's dry clinics will be given by Dr. A. M. Snell, Rochester, in medicine; by Dr. E. S. Judd, Rochester, in surgery; by Dr. F. C. Rodda, Minneapolis, in pediatrics; and by Dr. M. H. Tibbitts and Dr. J. R. Kuth, Duluth, in orthopedics.

The Russell D. Carman lecture in radiology, newly instituted by the Minnesota Radiological Society, will be given by Dr. A. B. Moore of Washington, D. C., Tuesday at 11 a. m. Dr. Donald Balfour of Rochester will outline the life of Dr. Carman, for whom the lectureship is a memorial, as an introduction to Dr. Moore's address.

A symposium on endocrinology will be a high-light of the Tuesday afternoon program.

Wednesday morning's dry clinics will be presented by Dr. F. E. B. Foley, Saint Paul, in urology; Dr. L. R. Gowan, Duluth, in neurology; Dr. O. H. Wangenstein, Minneapolis, in surgery; and Dr. George E. Broan, Rochester, in medicine.

Dr. P. T. Bohan, of Kansas University, will talk to the general assembly at 11 a. m. on cardiac irregularities with discussion by Dr. Walter Bierring of Des Moines, president of the American Medical Association.

Discussion of the injection treatment of hernia by Dr. Bratrud and Dr. J. C. Masson of Rochester will be a feature of the Wednesday afternoon program.

Monday's sessions will be devoted mainly to programs arranged by the special societies which include the Trudeau Society, the Heart Association, Obstetrics and Gynecology, the Orthopedic Society, Neurology and Psychiatry, the Radiological Society, and the Northwest Pediatric Association. Dr. L. G. Rowntree of Philadelphia will address a general assembly at 1:20 p. m. The Medical Question Court is scheduled for 4 p. m.

Speakers for the informal Monday evening meeting are Chief Justice John P. Devaney of the Supreme Court of Minnesota and Attorney General Harry H. Peterson. Entertainment will follow. The annual banquet will be held on Tuesday night.

The Women's Auxiliary to the state medical body will hold its annual meeting at the same time in Duluth. Dr. Bierring will be principal speaker before the women at their annual luncheon. Unusually pleasant social affairs are being arranged.

MEDICAL QUESTION COURT

A "Medical Question Court," novelty in state meeting programs, will be a feature of the Monday afternoon program of the eighty-first annual meeting of the Minnesota State Medical Association to be held in Duluth Monday, Tuesday and Wednesday, July 16 to 18.

Expert witnesses for this court will be drawn from among the distinguished out-state and Minnesota speakers scheduled to appear on the Monday program. Among them: Dr. W. L. Bierring, Des Moines, Ia., president of the American Medical Association; Dr. A. B. Moore, Washington, D. C., first lecturer for the newly inaugurated Russell D. Carman Lectureship in Radiology; Dr. L. G. Rowntree, Philadelphia; Dr. P. T. Bohan, Kansas City; Dr. J. W. Towey, Powers, Mich.; Dr. A. M. Snell, Rochester; Dr. R. M. Wilder, Rochester; Dr. J. C. Masson, Rochester; Dr. J. DeJ. Pemberton, Rochester; Dr. V. S. Counsellor, Rochester; Dr. W. F. Braasch, Rochester; Dr. W. J. Mayo, Rochester; Dr. J. C. Litzenberg, Minneapolis; Dr. O. H. Wangenstein, Minneapolis; Dr. E. M. Hammes, St. Paul; and Dr. A. S. Hamilton, Minneapolis.

Dr. William A. O'Brien, Associate Professor of Pathology and Preventive Medicine at the University of Minnesota, will act as court referee. Members in attendance will fill the role of judges.

Questions to be answered in this court are invited from all members. They should be sent in advance to the State Office, 11 W. Summit Avenue, Saint Paul. They will not be shown to the experts assigned to answer them until read in open court.

AMERICAN ASSOCIATION FOR THE STUDY OF GOITER

The American Association for the Study of Goiter will hold its next annual meeting June 7, 8, and 9, 1934, in Cleveland immediately preceding the American Medical Association meeting in that city.

Morning clinics will be held in the local hospitals of the city and Thursday and Friday afternoons will be devoted to addresses on various phases of the subject of goiter by outstanding members of the association.

The presidential address by Dr. R. M. Howard will be given at the Thursday evening meeting. The annual dinner Friday evening will be addressed by Dr. George W. Crile and Professor Francis H. Herrick, both of Cleveland.

CAMP RELEASE SOCIETY

The Camp Release Medical Society held its spring meeting at Dawson, Minnesota, April 6, 1934. Dr. T. W. Weum of Minneapolis addressed the members on "Some Problems in Obstetrics" and Dr. M. O. Henry gave an illustrated lecture on "Fractures." Dr. Charles Bolsta of Ortonville spoke on "Enforcement of the Basic Science Law." Dr. H. M. Johnson also discussed the importance of each physician's keeping in touch with his representative and senator, placing pressure where needed and keeping informed concerning candidates for election.

A short business session followed. Dr. Nels Westby of Madison was elected secretary to fill the unexpired term of Dr. J. Dordal, who resigned. Dr. M. A. Burns of Milan was elected alternate delegate in place of Dr. J. Dordal to the State Medical Association meeting at Duluth.

A real Dutch lunch was served following the business session, Dr. H. M. Johnson and Dr. Carl Johnson acting as hosts.

MINNESOTA HOSPITAL ASSOCIATION

The eleventh annual conference of the Minnesota Hospital Association will be held at Rochester, Minnesota, May 24 and 25, 1934. Invitation has been extended to hospital executives, trustees, medical staffs, nurses, dietitians, librarians and everyone interested in hospitals. No phase of hospital activities seems to have been omitted in the two-day program arranged.

MINNESOTA SOCIETY OF INTERNAL MEDICINE

The sixteenth semi-annual meeting of the Minnesota Society of Internal Medicine was held in the Assembly room of The Mayo Clinic at Rochester, Minnesota, April 23, 1934. An interesting program of medical subjects was presented. Following the dinner at the University Club the members and guests listened to an interesting address entitled "Wartime Reminiscences of the Royal Army Medical Corps," by Dr. Hugh Cabot, who saw active service at the front in the British medical corps.

The next meeting will be held at Duluth in the fall.

RENVILLE COUNTY

The Renville County Medical Society is in the midst of a University Extension Course which consists of weekly lectures and clinics from April 10 to May 29, inclusive. The course consists of the following:

- Colles Fracture—Dr. E. C. Robitshek
- Refraction, with General Practitioner's Equipment—Dr. E. A. Loomis
- Anaphylaxis—Dr. E. T. Herrmann
- Bedside Diagnosis—Dr. F. H. K. Schaaf
- Neuritis—Dr. H. B. Hannah
- Gynecology, Office Practice—Dr. W. H. Condit
- Technic of Labor—Dr. T. W. Weum
- Abnormal Child, Examination and Diagnosis—Dr. F. C. Rodda.

WASHINGTON COUNTY

The Washington County Medical Society held its regular monthly meeting at the Stillwater Club, March 13, 1934, at 6:30 p. m. Speakers were: E. K. Geer, Saint Paul, and Gilbert J. Thomas, Minneapolis.

Doctor Geer read twenty-six x-ray plates made of positive reactors among juniors and seniors of the Stillwater High School and discussed follow-up work and treatment.

Doctor Thomas gave an illustrated talk on the history and development of transurethral prostatic resection.

The monthly meeting of the Washington County Medical Society took place April 10 at the Stillwater Club.

After dinner the members heard an address on "Early Recognition of Cancer." Frank Savage, M.D., president of the Minnesota State Medical Association, gave statistics to show the increasing frequency of this dread malady. Some years ago tuberculosis used to occupy the first place. It is now about the sixth. Cancer then was in about sixth place and is now in the second.

It was pointed out that, if recognized early, tuberculosis can be conquered. This should also, perhaps in a lesser degree, be possible with cancer. Martin Nordland, M.D., chairman of the Cancer Committee of the Minnesota State Medical Association, spoke at some length on early recognition of cancer and emphasized earliest possible operation. It has been proved that two or three weeks delay, or even a few days, may prove fatal, or at least prevent the cure that otherwise might have been obtained.

The public is largely to blame for delays because of a fear that a certain growth or lump may be cancer. There is too long a delay in seeking a physician's advice, and, even worse, quacks are too often patronized. Because of delay the patient often is beyond any help, even the relief of pain. The public must realize that it is largely responsible for the increase in the mortality from this very serious and preventable condition.

William Stenstrom, Ph.D., of the University Hospital Cancer Institute, exhibited x-rays of cases and explained at length the value of x-rays and radium in the treatment of cancer. He emphasized its value after surgical removal to prevent recurrence.

E. SYDNEY BOLEYN, *Secretary*.

WOMAN'S AUXILIARY

President—Mrs. A. A. PASSER, Olivia
Chairman Press and Publicity—Mrs. GLEN R. MATCHAN, Minneapolis
Editor—Mrs. S. H. BAXTER, Minneapolis

HENNEPIN COUNTY AUXILIARY

An affair of unusual interest to all Minnesota doctors and their wives, was a dinner dance given by the Hennepin County Medical Society and the Auxiliary, April 25.

About four hundred members of both organizations gathered in the Medical Society's rooms to honor Mrs. William J. Byrnes, the first president of the Hennepin County Auxiliary, which was organized in 1910, the first medical auxiliary in the United States.

Seated at the speakers' table were Dr. C. A. Stewart and Mrs. Fred Erb, presidents of the two societies, Mrs. Stewart and Dr. Rae LaVake, Dr. and Mrs. James Blake. Dr. and Mrs. E. A. Meyerding, Mrs. Byrnes and Dr. and Mrs. Glenn Matchan.

Mrs. Byrnes was presented with a Past President's Jewel—the first of the kind to be presented in Minnesota. The pin is a facsimile of the official Minnesota State Medical Auxiliary insignia, which was adopted last May in Rochester.

The presentation was made by Mrs. Glenn Matchan, who had designed the insignia and the pin, and the presidents of the two organizations placed the jewel upon Mrs. Byrnes.

Following the dinner an informal reception was held for Mrs. Byrnes, all members placing their signatures in a book especially made for the purpose—a valuable memento long to be treasured by Mrs. Byrnes—the First President of the First Medical Auxiliary in America.

Bridge and dancing followed. The orchestra was composed of medical men of Hennepin County.

RAMSEY COUNTY AUXILIARY

Regular monthly meetings have been held with a good attendance, with Mrs. J. J. Ryan, president, in the chair. A Public Relations Tea was given in January. Guests invited included the presidents and one guest each from forty-five Saint Paul clubs. In March the Auxiliary voted unanimously to endorse Dr. Plondke's plan for a Retirement Fund for Aged and Indigent Physicians of Ramsey County and a committee was appointed to confer with the Ramsey County Medical Society concerning the plan. On April 23 a tea was given at the home of Mrs. F. M. Neher at which Mrs. A. A. Passer of Olivia, president of the State Auxiliary, was a guest.

WEST CENTRAL AUXILIARY

A regular meeting of the Auxiliary was held at Morris, April 11, at the Merchants Hotel with Mrs. E. A. Eberlin of Glenwood, president, presiding. A joint dinner meeting of the Medical Society and the Auxiliary preceded the business session. Guest speakers included Mrs. A. A. Passer of Olivia, State Auxiliary president; Dr. H. W. Meyerding of Rochester and Dr. Martin Nordland of Minneapolis.

SAINT LOUIS COUNTY AUXILIARY

The regular monthly luncheon meeting of the Auxiliary was held April 10, at the home of Mrs. W. N. Graves. The president of the Auxiliary, Mrs. A. J. Bianco, presided at the business session at which time plans were made for the entertainment of the Annual State Meeting in Duluth July 16-18, 1934. Guest speakers were Mrs. A. A. Passer, State Auxiliary president, and Dr. E. A. Meyerding, executive secretary of the State Medical Association.

PROCEEDINGS of the MINNESOTA ACADEMY OF MEDICINE

Meeting of March 14, 1934

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, March 14, 1934. Dinner was served at 7 o'clock and the meeting was called to order at 8 o'clock by the vice president, Dr. A. R. Hall.

There were sixty-four members and four guests present.

Minutes of the February meeting were read and approved.

Upon ballot the following men were elected members: Dr. Alfred Hoff (Saint Paul) to Active Membership, Dr. Waltman Walters (Rochester) to Associate Membership, and Dr. Hobart Reimann to the University membership list.

The scientific program followed.

SOME COMMENTS ON MORTALITY AND MORBIDITY TRENDS

HENRY WIREMAN COOK, M.D.
Minneapolis

Dr. Cook read his Inaugural Thesis on the above subject. This was illustrated with charts.

DISCUSSION

DR. F. R. WRIGHT (Minneapolis): We are what our ancestors were. You can't grow hickory or oak by planting willow or basswood. Dr. Cook's paper convinced me that the human basswood and willow multiply faster than the oak and hickory.

DR. C. B. WRIGHT (Minneapolis): I have enjoyed very much hearing this very well prepared paper. From the insurance standpoint it is very convincing. Practitioners of medicine, however, do not accept the conclusion of medical directors of insurance companies that small variations in blood pressure are as serious as they find. We must realize that after all the commercial pressure behind life insurance vitiates their results from the standpoint of a scientific research. The higher blood pressures are brought down to conform to their schedules and the lower blood pressures are raised for the same reason. The sales force of an insurance company exert great pressure for the acceptance of risks and the number of examinations a doctor may do has to a large extent depended on his willingness to play ball with the agent. If his financial reward had always depended on the number of applicants he rejected instead of on the number he accepted, these statistics would be quite different.

In regard to the degenerative diseases, the average age of the population has increased, therefore more people live to the age where this factor begins to play a larger part in mortality. Further, in regard to heart disease, diagnosis has very much improved in the last twenty years. Levy, in a study of 762 cases of coronary disease at the Presbyterian Hospital, New York City, in the period from 1910 to 1931, found that from 1910 to 1919 the diagnosis of coronary disease was made but seven times in 40,682 hospital admissions. In 1919, J. B. Herrick published his second paper on thrombosis of the coronary arteries. During the year 1920 the diagnosis of coronary disease was made eleven times, and, in 1931, eight patients in every 1,000 admitted were regarded as having impairment of the cardiac circulation.

DR. H. L. ULRICH (Minneapolis): I also want to voice my appreciation of this paper. I think Dr. Wright is quite correct in his criticism of insurance statistics. They are modified by erroneous diagnoses and the pressure of salesmanship.

In regard to the increase of deaths due to cardiovascular diseases and diabetes, they are degenerative diseases and people now live long enough to have degenerative diseases. In other words, there are more people living who can die of diabetes and cardiovascular diseases. With appendicitis it is different. I have a theory which explains the increased death rate from appendicitis. The American College of Surgeons has standardized our hospitals to such an extent that behind this smoke screen of standardization the mediocre surgeon can do his bit.

Dr. Cook mentions Bacchus and nicotine as possible factors in increasing degenerative changes. I am sorry he did not mention Venus, which would lead us on to Mercury. Our good friend, Dr. Paul White of Boston, has recently pointed out that in a large group of angina cases, alcohol and tobacco users possibly suffered less from angina than the group which abstained. Alcohol and tobacco have very little to do with arteriosclerosis, and the functional effect (spasm) has been over-stated.

DR. C. B. WRIGHT: I cannot entirely agree with Dr. Ulrich that the increased mortality in appendicitis should be laid on the doorstep of the surgeon. I am inclined to feel that medical men are more responsible than surgeons. There is a tendency to delay in these abdominal conditions for x-ray and other examinations, to definitely localize the pathology instead of being satisfied with that more indefinite diagnosis of "acute surgical abdomen" and demanding immediate operation.

DR. E. M. JONES (St. Paul): I have been very much interested in the reports of the high mortality in appendicitis, so last year we analyzed the pathologically proven cases of appendicitis that were operated on at the Ancker Hospital from 1928 to 1932. There were 230 cases with a mortality of 9.2 per cent. These cases were taken from the combined surgical service. We found that all the cases that died came to us late. Not so many years ago we felt that too much stress was placed on appendicitis and I think the public were quite appendicitis-minded and possibly too much so; but I feel as Dr. Wright does, that appendicitis is still a very common disease and a serious one and we should always be on the lookout for it. I am of the opinion that the increased mortality is due to the delay in bringing these cases to the surgeon.

DR. COOK (in closing): I appreciate very much the generous discussion of this paper. I would like to comment on one or two of the suggestions made. We do not get anywhere by a discussion of whether the surgeon or the medical man is at fault, because I feel sure neither is responsible for the mortality trends I mentioned. From the point of view of the medical men it is undoubtedly true that insulin is not being used early enough in diabetes. Surgeons, of course, cure appendicitis in a far larger proportion of cases than 30 or 40 years ago; but the real trouble is that appendicitis and diabetes are today so much more prevalent than a quarter of a century ago. The lesson I think we must draw from these statistics is that there is a malign influence in our civilized life today that was not present a generation ago. I think we should see that and try to solve the problem of what is the matter with modern life as contrasted with that before the Civil War, both mental, moral and spiritual. The men who commit suicide today are weaker than those who met the strains of previous generations. There is a change in character that is reflected in or coincident with physical weakness.

In regard to Dr. Wright's comments on blood pressure, I think he is entirely right in stating that physicians shade blood pressures they report to insurance companies. If an examiner thinks 145 will not get by,

but 140 will, he will shade it. I think there is no question but that our statistics are modified by this, but we take that into consideration. Also the fact Dr. Wright brought out, is that more people are living to an age when these changes are operating, and we do not overlook this fundamental fact. But what I tried to emphasize is that a man of 45 today has a lessened life expectancy than a man of 45 had forty or fifty years ago. One thousand men of 45 today will not live as long as they would have 100 years ago, and I think the medical profession should recognize this change and try to correct it.

OPERATIVE DIVISION OF THE HORSESHOE KIDNEY

F. E. B. FOLEY, M.D.
Saint Paul

Dr. Foley's paper was illustrated with x-ray films and lantern slides. Several cases were reported.

DISCUSSION

DR. W. F. BRAASCH (Rochester): I am so accustomed, on being called upon to discuss Dr. Foley's papers, to find it necessary to preface my remarks by complimenting him upon his progressive work that it is getting to be a matter of routine. His contribution this evening is again a very progressive one. Few urologists in the country have given the condition known as horseshoe kidney more study than Dr. Foley. His suggestions in regard to the treatment of pain, which seems to be caused by this anomaly, are most interesting.

We have observed some forty fused kidneys at the Mayo Clinic; most of them were found during the last few years because of the routine use of urography, both intravenous and retrograde, in the differential diagnosis of abdominal pain. The existence of horseshoe kidney may be surmised from either of the following data referred to the supra-umbilical area: (1) pain; (2) tumor; (3) crescent-shaped soft tissue shadow extending across the spine; or (4) one or more opaque shadows of calcification. Apparent sacculization of the renal pelvis or pyelectasis graded 1 or 2 is often observed with horseshoe kidney. In such cases the retention test or, better still, pyeloscopy might be of value in determining whether there is actual stasis in the renal pelvis. Patients with fused kidney are observed occasionally in whom pain is apparently caused by pressure on the renal pedicle or large blood vessels, which may be relieved by displacing the kidney from its anomalous position. It may be difficult in some cases to determine whether the abdominal pain complained of has its origin in the anomalous kidney. Many patients with fused kidneys have no abdominal pain or any other complaint referable to the kidney.

It is very evident that there has been a definite change in the outline of the renal pelvis shown by Dr. Foley following the plastic operation that he made. This should prove that actual obstruction of the renal pelvis existed prior to operation. The fact that the pain disappeared and has remained absent since the operation should prove the value of the proposed operation. Dr. Foley's contribution is a most interesting one and we should be on the lookout more for suitable cases in which his suggestions might be employed.

DR. FOLEY (in closing): I greatly appreciate Dr. Braasch's excellent discussion of the subject. I share his view that the anomaly is not always the cause of the symptoms complained of. Accordingly, division of the isthmus is not indicated in all cases. Besides the cases I have reported tonight, we have encountered four or five other horseshoe kidneys in which it was not felt the symptoms were caused by the anomaly. In these cases nothing was done. In another case, right-sided pain was associated with stone in the right pelvis of a

horseshoe kidney. The stone was removed but the isthmus was not divided. The cases I have reported speak for themselves. They all show complete relief of symptoms combined with postoperative pyeloureterograms scarcely to be distinguished from normal.

Dr. Braasch spoke of serial pyelo-ureterograms or pyeloscopy as a means of demonstrating retention in the pelvis. That these procedures are capable of serving this purpose there is no doubt. However, I am not so sure that all cases of obstruction producing painful symptoms will show pelvic dilatation or retention demonstrable by these means. There is much that indicates that, in horseshoe kidney, obstruction, whether accompanied by dilatation and demonstrable retention or not, is not the sole cause of painful symptoms. The cases I reported tonight all showed slight degrees of pelvic dilatation and, therefore, do not contribute much in support of this assertion.

AN UNUSUAL FORM OF RENAL POLYCYSTIC DISEASE

WILLIAM F. BRAASCH, M.D.
Rochester

Dr. Braasch presented the kidney specimen and also showed several x-ray films.

DISCUSSION

DR. F. E. B. FOLEY (Saint Paul): The case which Dr. Braasch reports is a remarkably unusual and interesting one. The main question to be decided is whether or not it is a true polycystic kidney; that is, do the histologic appearance of the cysts and their relation to the kidney structure conform to what we know as congenital polycystic disease? I would like to ask Dr. Braasch what comments the pathologists and histologists at Rochester had to make in regard to these questions and whether they considered it a true polycystic kidney. Grossly, it appears to be an example of this condition.

The usual embryologic explanation of polycystic disease, while plausible, has not seemed to be entirely satisfactory and acceptable. The explanation has been that the elements of the kidney derived from the Wolffian duct, that is, ureter, pelvis and other parts of the excretory channels, fail to effect unions with the secretory elements, i.e., the glomeruli and connecting tubules derived from the renal blastema. According to this theory no excretory channels are provided for the glomeruli and as a result the cysts form. In polycystic kidney disease frequently there are similar cysts in the liver and spleen. The development of these organs is quite different from the development of the kidney and accordingly this theory fails to explain the concomitant presence of liver and spleen cysts in such cases. If this kidney which Dr. Braasch has shown is actually a polycystic kidney, it certainly further discredits this theory of polycystic disease.

DR. BRAASCH (in closing): The hypothesis which Dr. Foley has advanced in regard to the congenital etiology of polycystic kidney is similar to that which Dr. White described many years ago. Among the various theories advanced is that recently given by Dr. Beeson,[†] in which he suggests the possibility of incomplete development of the renal blastema.

If the kidney specimen which I have shown is not a polycystic kidney, what is it? Just exactly what constricted the tubules in this case so as to cause cystic changes in the glomeruli is difficult to say. It is evident that the etiologic factors must be of recent origin. It is my impression that the cystic lesion in this case is an acquired condition and not congenital.

[†]Beeson, Harold G.: Polycystic disease in a premature infant. *Jour. Urol.*, 30, No. 3, 285-298, Sept., 1933.

PAPILLARY CARCINOMA OF THE KIDNEY PELVIS

A CASE REPORT

JOHN F. NOBLE, M.D.
Saint Paul

This case is from the Urologic Service at the Ancker Hospital. The patient was a young man 26 years of age, who was first seen in the Out-patient Department during the first week of March, 1934. He was admitted to the hospital March 11, 1934, complaining of attacks of hematuria, frequency, burning urination, and nocturia. The frequency, burning urination, and nocturia had been present for as long as he could remember. During the three weeks prior to his admission, he had had four attacks of gross hematuria. Between these attacks his urine was clear and there was no blood in his urine at the time of admission to the hospital. He also complained of lumbar pain on the right side, which had been present intermittently for two years but which had been absent for two months before his first attack of hematuria. This pain recurred when blood was first noted in the urine.

Physical examination was negative save for tenderness on Murphy percussion over the right kidney area. I will ask Dr. Foley to show and interpret the pyelograms.

DR. FOLEY: The pyelogram made at the first cystoscopy (showing film) showed a low-lying well-filled pelvis with convex upper border exhibiting only two calyces, middle and inferior. This suggested the possibility of a duplication of the kidney and ureter, the catheter having entered the ureter going to the lower pelvis. On the basis of this interpretation it was felt the pathologic change responsible for the hematuria might be confined to the upper pole of the kidney drained by a second pelvis representing the upper half of a duplication. To bring this question to conclusion a second cystoscopy was made. The right side of the trigone was carefully searched for a second ureteral opening, without finding one. On this occasion considerably more pressure was employed on injecting the contrast medium and the injection was continued under pressure as the catheter was withdrawn in an attempt to force the medium into the bifurcation of the ureter in case of incomplete duplication. This pyelogram (showing film) shows the medium to have passed through a markedly strictured superior calyx out into the dilated pockets, as you see here. The changes were attributed either to simple stricture of the calyx with caliectasis or to "partially closed" renal tuberculosis.

DR. NOBLE: The right kidney was removed by Dr. Foley March 12, 1934. The specimen showed a fungating tumor of the pelvis involving almost the entire mucosal surface. It was firm but friable and, near the center of the kidney, it almost completely obstructed the lumen of the pelvis. The calices above the point of obstruction were dilated and this dilatation accounted for the picture obtained when the cystoscopic injection of opaque media was made under pressure. There was no gross evidence of invasion of the parenchyma of the kidney by the tumor, and the mucosa of the ureter in that portion removed at operation showed no evidence of tumor.

The tumor proved, microscopically, to be a papillary carcinoma. It was composed of closely packed papillomatous processes, having fine connective tissue cores which carried the vascular supply of the tumor. The basilar epithelial cells were almost columnar and were overlaid by many layers of epithelial cells which tended toward a spindle shape. In certain areas, squamous types of epithelial cells were seen. Mitotic figures were frequent and the tumor showed evidence of rapid growth.

Tumors of the pelvis of the kidney are very similar

to the tumors of the bladder. The benign papillomata are similar and may exist in the pelvis of the kidney for many years without any evidence of malignant change. Tumors similar to the one just reported are commonly seen in the bladder. In some instances, the epithelial tumors of the kidney pelvis may be keratinizing squamous cell carcinoma. Occasional cases of alveolar carcinoma have been reported in the kidney pelvis. The histogenesis of these tumors is not clear.

I have not had sufficient experience on which to form an opinion as to the prognosis in this case, but in all probability the tumor is as malignant, at least, as a hypernephroma. The tumors are very prone to recur by implantation in the lower ureter or bladder.

DISCUSSION

DR. FOLEY: I thought this was a very interesting case and quite worth reporting. In the first place papillary tumors of the renal pelvis are relatively rare; secondly, the pyelographic findings are bizarre and instructive. I am not sure that the correct diagnosis should have been made from the pyelogram but certainly in the future I will try to take into account the possibility of papillary carcinoma of the renal pelvis when obstruction of the infundibulum of a calyx is demonstrated in the pyelogram.

As the recurrence of such neoplasms often is due to transplants in the ureter, it is planned to remove the remaining portion of the ureter and right ureteral ridge at a second operation.

DR. A. F. BRAASCH: We have recently reviewed our experience with primary tumors of the renal pelvis and Dr. Cabot made a report of our data before the International Congress of Urology held in London last summer. We found that the percentage of five-year cures is very low and that the lesions must be regarded as unusually malignant. Since the tumor is very apt to have metastatic extension into the ureter and even into that portion of the bladder adjacent to the ureteral orifice, the entire ureter and adjacent bladder should be removed as advised by Judd and Hunt. I have been able to demonstrate the existence of metastases in the ureterogram in several cases. The pyelogram in this case is a most interesting one.

DR. NOBLE (in closing): I think the point Dr. Braasch brought out with reference to the age of the patient is very important in considering the prognosis in this case. In the presence of malignant disease in a young individual, the prognosis should always be guarded.

The meeting adjourned.

R. T. LA VAKE, M.D., *Secretary.*

BACILLUS BULGARICUS AND KEFIR FUNGI PREPARATIONS OMITTED FROM N.N.R.

The Council on Pharmacy and Chemistry reports that for some years it has retained in New and Non-official Remedies the accepted *Bacillus bulgaricus* preparations only on condition that claims for them were limited to recommendations for the preparation of soured milk and provided especially that no claims were made for the implantation of *B. bulgaricus* in the intestine. The Council further held that milk soured by the addition of pure lactic acid has essentially the same therapeutic effect as milk soured by bacterial fermentation. The Council deemed it unwise to retain in future editions of New and Non-official Remedies preparations of *Bacillus bulgaricus* and of Kefir fungi, since in addition to being thus superfluous, they are in general indefinite, complex and variable. The Council voted to omit all *Bacillus bulgaricus* preparations and Kefir fungi preparations from New and Non-official Remedies. These include: *Bacillus Bulgaricus*-Squibb, B. B. Culture and Kefir Fungi. (Jour. A. M. A., July 1, 1933, p. 34.)

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

Books Received For Review

THE MANAGEMENT OF FRACTURES, DISLOCATIONS AND SPRAINS. John Albert Key, B.S., M.D., Clinical Professor of Orthopedic Surgery, Washington University School of Medicine, and H. Earle Conwell, M.D., F.A.C.S., Orthopedic Surgeon for the Tennessee Coal, Iron and Railroad Company, Birmingham, Ala., etc. 1,164 pages. Illus. Price: \$15.00, cloth. Saint Louis: C. V. Mosby Co., 1934.

THE SPUTUM, ITS EXAMINATION AND CLINICAL SIGNIFICANCE. Randall Clifford, M.D., Associate in Medicine, Peter Bent Brigham Hospital, Assistant in Medicine, Harvard Medical School, etc. Macmillan Medical Monographs, Geo. R. Minot, M.D., S.D., Editorial Advisor. 167 pages. Illus. Price, \$4.00. New York: The Macmillan Company, 1932.

This handy little volume of 167 pages, with seven colored plates and twenty-one other illustrations, mostly photographs, is the result of the combined efforts of a group associated in the Pulmonary Clinic at the Massachusetts General Hospital. It lives up to its avowed purpose of bringing together in one volume, for general use, methods of collecting and staining sputum, with a description and interpretation of the more important of its macroscopic aspects and microscopic constituents; grouped in such a way that the results of the sputum examination may be a guide in clinical diagnosis and treatment. Sections are devoted to the above mentioned topics and fifty pages are devoted to the consideration of the character and clinical significance of the sputum in some eighteen of the more common bronchial and pulmonary diseases. This is indeed a practical guide, containing as it does only the simple methods of examination which have proved of sound diagnostic value. It should be in the hands of every technician, medical student and physician interested in diagnosis of diseases of the bronchi and lungs.

A. W. DAHLSTROM, M.D.

GASTRIC ANACIDITY, ITS RELATION TO DISEASE. Arthur L. Bloomfield, M.D., Professor of Medicine, Stanford University, and W. Scott Pollard, M.D., Instructor in Medicine, Stanford University. Macmillan Medical Monographs, Geo. R. Minot, M.D., S.D., Editorial Advisor. 188 pages. Illus. Price, \$2.50. New York: The Macmillan Company, 1933.

This monograph of some 185 pages brings under one roof the facts and recorded opinions of the authors and some 215 other investigators in this and related fields. Chapters are devoted to methods of testing and measurement; some eighty pages to the consideration of true acidity, its nature, incidence and the associated conditions; false acidity; and anacidity as considered in relation to pernicious anemia, carcinoma and other diseases, and finally the prognosis and therapy of this syndrome. There is appended to each chapter an up-to-date bibliography. This little work should be in the hands of everyone interested in this subject.

A. W. DAHLSTROM, M.D.

TREATMENT OF THE COMMONER DISEASES.

Lewellys F. Barker, M.D., 319 pages. Illus. Price, \$3.00. Philadelphia: J. B. Lippincott Co., 1934.

This small volume is based on a series of ten lectures given in the annual course of postgraduate lectures to the Academy of Medicine of Lima and Allen Counties, Ohio.

As might be expected in lectures by Dr. Barker, there is, all the way through, evidence of a tremendous clinical experience. This book is small and informal and, as stated in the preface, no attempt is made to discuss any topic fully and completely; but rather there are suggestions for treatment and correlations between old and new ideas of disease and treatment. In the first chapter on "Advances and Methods of Studying Patients," there is more good common sense than in many a long book and anyone, however great his experience, will profit by reading it. There are many things which we all know in this book, but many things we all forget, and, while it is in no sense a complete thesis on either the commoner diseases or treatment, it still is a small, easily readable book, which can either be used for desultory reading or reference on the office desk.

H. B. SWEETSER, JR., M.D.

STATEMENTS ON CONSTIPATION IN LAY ADVERTISING FOR ROUGHAGE FOODS AND BRAN

The Committee on Foods reports that constipation may be due to causes other than those of dietary or "roughage" origin. Advertising to the laity shall refer to constipation due to insufficient roughage or food essentials only. Cases of constipation not yielding to the regular ingestion of foods providing considerable roughage should be under the care of a competent physician. A permissible claim for a roughage food follows: "Constipation due to insufficient roughage in the diet should yield to . . . eaten regularly. A competent physician should be consulted for cases not corrected in this simple manner." Wheat bran has laxative value. Whole grain cereals, and vegetables and fruits in general, are excellent sources of roughage. Bran itself may be irritating to sensitive bowels; the indigestible cellulose of vegetables and fruits is much less irritating. (Jour. A. M. A., November 5, 1932, p. 1605.)

MOUTH WASHES AND GARGLES

The Council on Dental Therapeutics of the American Dental Association, founded and organized after the manner of the Council on Pharmacy and Chemistry of the American Medical Association, has begun to secure order in the complex and difficult field in which it works. Among the most recent of its publications is a consideration of the subject of mouth washes. The Council on Dental Therapeutics feels that the usual run of mouth washes are not medicines in any sense of the word and really serve no more intrinsic purpose than as an aid in the mouth toilet in the removal of loose food and debris. While the Council does not specifically attack the claims made for any widely advertised mouth wash, it does point out that the claim that a mouth wash removes mucin films is too remote to warrant serious consideration, which is, of course, a direct thrust at the claims made for such products as Mu-Sol-Dent. It continues with the assertion that the same statement applies to neutralization of mouth acidity; and to halitosis, which is a specific indictment of the advertised claims for such preparations as Listerine and Pepsodent. Before investing money in any of these toilet articles, therefore, the medical profession, the dental profession and the public will do well to realize the limitations of the products so far as concerns their value for the prevention and treatment of disease. (Jour. A. M. A., July 23, 1932, p. 310.)

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 Wing, Douglas, Hubbard, Mille Lacs, Morrison,
 Todd, Wadena

DISTRICT NO. 8

W. L. BURNAP, M.D.....Fergus Falls
 Counties—Becker, Clay, Grant, Kittson, Lake of the
 Woods, Mahnomen, Marshall, Norman, Otter Tail,
 Pennington, Polk, Red Lake, Roseau, Traverse,
 Wilkin

DISTRICT NO. 9

W. A. COVENTRY, M.D.....Duluth
 Counties—Aitkin, Carlton, Cook, Itasca, Kanabec,
 Koochiching, Lake, Pine, St. Louis

MINNESOTA STATE MEDICAL ASSOCIATION

COUNTY SOCIETY ROSTER

BLUE EARTH COUNTY MEDICAL SOCIETY*

Regular meetings, last Monday of each month
Annual meeting, December
Number of Members: 29

President
Huffington, H. L. Mankato

Secretary
Koenigsberger, Charles. Mankato

Andrews, R. N. Mankato
Benham, E. W. Mankato
Black, William Mankato
Butzer, J. A. Mankato
Cosgriff, J. A. Bird Island

Dahl, G. A. Mankato
Denman, A. V. Mankato
Edwards, R. T. Elysian
Franchere, F. W. Lake Crystal
Fugina, G. R. Mankato
Hassett, R. G. Mankato
Holbrook, J. S. Mankato
Howard, M. I. Mankato
Huffington, H. L. Mankato
Koenigsberger, Charles. Mankato
Liedloff, A. G. Mankato
Lloyd, H. J. Mankato

Macbeth, J. L. St. Clair
Miller, V. I. Mankato
O'Connor, P. H. Amboy
Osborn, Lida Mankato
Schlesselman, J. T. Mankato
Schmidt, P. A. Good Thunder
Sohmer, A. E. Mankato
Stillwell, W. C. Mankato
Troost, H. B. Mankato
Vezina, J. C. Mapleton
Wentworth, A. J. Mankato
Williams, H. O. Lake Crystal

BLUE EARTH VALLEY MEDICAL SOCIETY

Faribault and Martin Counties
Regular meetings, First Thursday, May and October
Annual meeting, October
Number of Members: 29

President
Farrish, R. C. Sherburne

Secretary
Hunt, R. C. Fairmont

Bailey, H. B. Fairmont
Barr, W. H. Wells
Blanchard, H. G. Fairmont
Boysen, Herbert. Welcome

Butz, J. A. Monterey
Chambers, W. C. Blue Earth
Demo, P. W. Wells
Durgin, F. L. Winnebago
Farrish, R. C. Sherburne
Folta, John. Ceylon
Heimark, J. J. Fairmont
Henderson, A. J. Kiester
Holm, P. F. Wells
Hunt, A. F. Bylas, Arizona

Hunt, R. C. Fairmont
Jacobs, A. C. Elmore
Johnson, H. P. Fairmont
Logan, F. W. Blue Earth
Luedtke, G. H. Fairmont
McGroarity, J. J. Easton
Miller, H. A. Fairmont
Mills, J. L. Winnebago
Richardson, W. J. Fairmont
Russ, H. H. Blue Earth

CAMP RELEASE DISTRICT MEDICAL SOCIETY

Chippewa, Lac Qui Parle, and Yellow Medicine Counties
Regular meetings, Fourth Thursday of January, April, July
Annual meeting, Fourth Thursday in October
Number of Members: 24

President
Holmberg, L. J. Canby

Secretary
Westby, Nels. Madison

Bacon, R. S. Montevideo
Bergh, L. N. Montevideo
Burns, M. A. Milan
Cress, E. E. Boyd

Duncan, Henry. Marietta
Foshager, H. T. Clara City
Hauge, M. I. Clarkfield
Hauge, M. M. Clarkfield
Herbert, W. L. Maynard
Holmberg, L. J. Canby
Johnson, C. M. Dawson
Johnson, H. M. Dawson
Jordan, L. S. Granite Falls
Kilbride, J. S. Canby

Lee, W. N. Madison
Lima, Ludvig. Montevideo
Nelson, M. S. Granite Falls
Olson, W. P. Gaylord
Roust, H. A. Montevideo
Sherman, H. T. Bellingham
Smith, L. G. Montevideo
Tangen, G. M. Canby
Westby, Magnus. Madison
Westby, Nels. Madison

CLAY-BECKER COUNTY MEDICAL SOCIETY

Regular meetings, Midsummer and Annual
Annual meeting, December
Number of Members: 21

President
Simison, C. W. Hawley

Secretary
Jolin, R. V. Lake Park

Aborn, W. H. Hawley
Archibald, F. M. Mahanomen
Bergheim, M. C. Hawley

Bottolfson, B. T. Moorhead
Carman, J. E. Detroit Lakes
Duncan, J. W. Moorhead
Ellingson, A. R. Detroit Lakes
Flancher, L. H. Lake Park
Gosslee, G. L. Moorhead
Hagen, O. J. Moorhead
Haight, G. G. Audubon
Humphrey, E. W. Moorhead

Ingebrigtsen, E. K. Moorhead
Jolin, R. V. Lake Park
Larsen, O. O. Detroit Lakes
Larson, A. L. Detroit Lakes
Rutledge, L. H. Detroit Lakes
Simison, C. W. Hawley
Soine, T. S. Barnesville
Thornby, H. J. Moorhead
Thyssel, F. A. Moorhead

EAST CENTRAL MINNESOTA MEDICAL SOCIETY

Anoka, Chisago, Isanti, Kanabec, Mille Lacs, Pine and Sherburne Counties
Regular meetings, May, July, October
Annual meeting, November
Number of Members: 36

President
Hedenstrom, L. H. Cambridge

Secretary
Schoofs, G. E. North Branch

Arends, A. L. Askov
Blumenthal, J. S. Columbia Heights
Bossert, C. S. Mora
Brown, R. W. Cambridge
Brownstone, Manuel. Sandstone
Callahan, F. F. Pokegama
Cooney, H. C. Princeton
Dredge, H. P. Sandstone

Ehmke, W. C. Willow River
Flom, A. O. Chisago City
Gates, C. E. Anoka
Halpin, J. E. Rush City
Hansen, Elmer H. Princeton
Hedenstrom, L. H. Cambridge
Henry, C. J. Milaca
Heseltine, V. G. Taylors Falls
Holmes, A. E. Rush City
Kelsey, C. G. Hinckley
McBroom, D. E. Cambridge
Nethercott, E. G. Pine City
Nordman, W. F. Mora
Norrgard, H. T. Milaca

Peterson, A. A. Mora
Phelps, A. G. St. Paul
Roehlke, A. B. Elk River
Schlesselman, George. Anoka
Schoofs, G. E. North Branch
Stephan, E. L. Hinckley
Stratte, A. K. Pine City
Swensen, R. G. Harris
Swenson, Charles. Braham
Truog, C. P. Lindstrom
Vik, Melvin. Onamia
Vrooman, F. E. St. Francis
Wahlberg, E. W. Isle
Zein, Thomas. North Branch

GOODHUE COUNTY MEDICAL SOCIETY

Regular meetings, none
Annual meeting, Second Friday of December
Number of members: 19

President	
Juergs, E. H.	Red Wing
Secretary	
Steffens, L. A.	Red Wing
Aanes, A. M.	Red Wing
Anderson, S. H.	Red Wing
Brusegard, J. F.	Red Wing

Claydon, D. R.	Red Wing
Claydon, L. E.	Red Wing
Cremer, M. H.	Red Wing
Cremer, P. H.	Hastings
Fortney, G. O.	Zumbrota
Hedin, R. F.	Red Wing
Johnson, A. E.	Red Wing
Jones, A. W.	Red Wing

Juergs, E. H.	Red Wing
Laffrig, W. W.	Goodhue
Mack, J. J.	Fordyce, Arkansas
McGuigan, H. T.	Red Wing
Smith, M. W.	Red Wing
Steffens, L. A.	Red Wing
Vaaler, T.	Cannon Falls
Williams, M. R.	Cannon Falls

FREEBORN COUNTY MEDICAL SOCIETY

Regular meetings, Quarterly
Annual meeting, December
Number of Members: 18

President	
Burns, H. D.	Albert Lea
Secretary	
Freligh, W. P.	Albert Lea
Burns, H. D.	Albert Lea
Butturff, C. R.	Freeborn

Folken, F. G.	Albert Lea
Freeman, J. P.	Albert Lea
Freligh, W. P.	Albert Lea
Gamble, J. W.	Albert Lea
Gamble, P. M.	Albert Lea
Gamble, R. M.	Albert Lea
Gullixson, A.	Albert Lea
Kaasa, L. J.	Albert Lea

Kamp, B. A.	Albert Lea
Leopard, B. A.	Albert Lea
Manley, L. V.	Albert Lea
Palmer, C. F.	Albert Lea
Palmer, W. L.	Albert Lea
Schultz, J. A.	Albert Lea
Trombley, R. A.	Emmons
Whitson, S. A.	Alden

HENNEPIN COUNTY MEDICAL SOCIETY

Regular meetings, First Monday Each Month
Annual meeting, October
Number of Members: 523

President	
Stewart, C. A.	Minneapolis
Secretary	
Campbell, O. J.	Minneapolis

Aling, C. P.	Minneapolis
Allen, H. W.	Minneapolis
Allison, R. G.	Minneapolis
Altow, Hugo	Minneapolis
Andersen, A. G.	Minneapolis
Andersen, S. C.	Minneapolis
Anderson, D. D.	Minneapolis
Anderson, E. D.	Minneapolis
Anderson, E. R.	Minneapolis
Anderson, F. J.	Minneapolis
Anderson, J. K.	Minneapolis
Anderson, K. W.	Minneapolis
Anderson, P. A.	Minneapolis
Anderson, U. S.	Minneapolis
Andreassen, E. C.	Minneapolis
Annis, H. B.	Minneapolis
Arey, H. C.	Excelsior
Arlander, C. E.	Minneapolis
Arnold, D. C.	Minneapolis
Arvidson, C. G.	Minneapolis
Aune, Martin	Minneapolis
Aurand, W. H.	Minneapolis
Avery, J. F.	Minneapolis
Baken, M. P.	Minneapolis
Baker, A. T.	Minneapolis
Baker, E. L.	Minneapolis
Baker, Looe	Minneapolis
Barber, J. P.	Minneapolis
Barron, Moses	Minneapolis
Bass, G. W.	Minneapolis
Bayard, H. F.	Minneapolis
Beard, A. H.	Minneapolis
Beard, R. O.	Minneapolis
Beckman, W. G.	Minneapolis
Bedford, E. W.	Minneapolis
Bell, E. T.	Minneapolis
Benedict, E. E.	Minneapolis
Bennjamin, A. E.	Minneapolis
Benn, F. G.	Minneapolis
Berkwitz, N. J.	Minneapolis
Bessenes, A. N., Jr.	Minneapolis
Bessenes, A. N., Sr.	Minneapolis
Bessenes, D. H.	Minneapolis
Bessenes, W. A.	Minneapolis
Blake, James	Hopkins
Blaustone, H. H.	Minneapolis
Boies, L. R.	Minneapolis
Booth, A. E.	Minneapolis
Boquist, H. S.	Minneapolis
Boreen, C. A.	Minneapolis
Borgeson, E. J.	Minneapolis
Bostrom, A. E.	St. Paul
Bouman, H. A. H.	Minneapolis
Boynton, Ruth	Minneapolis
Bracken, H. M.	Claremont, Calif.
Bratrud, A. F.	Minneapolis
Brown, E. D.	Minneapolis
Brown, E. J.	Minneapolis

Bulkley, Kenneth	Minneapolis
Bullard, Mattie J.	Minneapolis
Butler, John	Minneapolis
Buzzelle, L. K.	Minneapolis
Cable, M. L.	Minneapolis
Cabot, G. S.	Minneapolis
Cabot, V. S.	Minneapolis
Cady, L. H.	Minneapolis
Cameron, Isabell	Minneapolis
Camp, W. E.	Minneapolis
Campbell, L. M.	Minneapolis
Campbell, O. J.	Minneapolis
Cardle, A. E.	Minneapolis
Carlaw, C. M.	Minneapolis
Carlson, Lawrence	Minneapolis
Caron, R. P.	Minneapolis
Cavanor, F. T.	Minneapolis
Cherry, C. H.	Minneapolis
Chesley, A. J.	Minneapolis
Christenson, C. R.	Minneapolis
Christianson, H. W.	Minneapolis
Clark, H. S.	Minneapolis
Cohen, S. S.	Oak Terrace
Condit, W. H.	Minneapolis
Cook, H. W.	Minneapolis
Corbett, J. F.	Minneapolis
Cornica, A. D.	Minneapolis
Cosman, E. O.	Minneapolis
Cottam, G. G.	Minneapolis
Crafts, L. M.	Minneapolis
Cranmer, R. R.	Minneapolis
Cranston, R. W.	St. Louis Park
Curtin, J. F.	Minneapolis
Cutts, George	Minneapolis
Cutts, R. E.	Minneapolis
Dady, E. E.	Minneapolis
Dahl, E. O.	Minneapolis
Dahl, J. A.	Minneapolis
Daniel, D. H.	Minneapolis
Daniel, L. M.	Minneapolis
Dart, L. O.	Minneapolis
Davis, J. C.	Minneapolis
Deveraux, T. J.	Wayzata
Dichl, H. S.	Minneapolis
Diehsner, H. D.	Minneapolis
Donaldson, C. A.	Mesa, Arizona
Dorge, R. I.	Minneapolis
Dornblaser, H. B.	Minneapolis
Dorsey, G. C.	Minneapolis
Doxey, G. L.	Minneapolis
Doyle, L. O.	Minneapolis
Drake, C. R.	Minneapolis
Drill, H. E.	Hopkins
Dumas, A. G.	Minneapolis
Dunlap, E. H.	Minneapolis
Dunn, G. R.	Minneapolis
Duryea, Marbry	Minneapolis
Duryea, W. M.	Minneapolis
Dutton, C. E.	Minneapolis
Dvorak, B. A.	Minneapolis
Dwan, P. F.	Minneapolis
Dworsky, S. D.	Minneapolis
Ehrenberg, C. J.	Minneapolis
Ehrlich, S. P.	Minneapolis
Eich, Matthew	Minneapolis
Eistenstadt, D. H.	Minneapolis

Eitel, G. D.	Minneapolis
Ellison, D. E.	Minneapolis
Engstrand, O. J.	Minneapolis
Erb, F. A.	Minneapolis
Erdmann, C. A.	Minneapolis
Erickson, R. F.	Minneapolis
Ericson, R. M.	Minneapolis
Evans, E. T.	Minneapolis
Evans, R. D.	Minneapolis
Exley, E. W. F.	Minneapolis
Fahr, G. E.	Minneapolis
Fansler, W. A.	Minneapolis
Fasbender, H. A.	Hastings
Feeney, J. M.	Minneapolis
Fenger, E. P. K.	Oak Terrace
Fetterly, Warren	Minneapolis
Fink, L. W.	Minneapolis
Fink, W. H.	Minneapolis
Fitzgerald, D. F.	Minneapolis
Fjelstad, C. A.	Minneapolis
Ford, W. H.	Minneapolis
Foster, W. K.	Minneapolis
Fowler, L. H.	Minneapolis
Frery, Louise G.	Minneapolis
Fredericks, G. M.	Minneapolis
French, Maude S. S.	Minneapolis
Friedell, Aaron	Minneapolis
Frochlich, H. W.	Minneapolis
Funk, V. K.	Oak Terrace
Gammell, J. H.	Minneapolis
Gardner, E. L.	Minneapolis
Giere, E. O.	Minneapolis
Giere, J. C.	Minneapolis
Giere, R. W.	Minneapolis
Glessler, P. W.	Minneapolis
Gilles, F. L.	Minneapolis
Gingold, B. A.	Minneapolis
Ginsberg, Harry	Minneapolis
Gratzek, F. R.	Minneapolis
Graves, Floyd	Minneapolis
Gray, R. C.	Minneapolis
Green, E. K.	Minneapolis
Greene, W. P.	Minneapolis
Greisheimer, Esther M.	Minneapolis
Grimes, Marian	Minneapolis
Gronvall, P. R.	Minneapolis
Gunderson, N. A.	Minneapolis
Gustafson, H. T.	Minneapolis
Hacking, F. H.	Minneapolis
Hagen, G. L.	Minneapolis
Hall, J. M.	Minneapolis
Hallberg, C. A.	Minneapolis
Hamel, A. L.	Minneapolis
Hamilton, A. S.	Minneapolis
Hamlin, G. B.	Minneapolis
Hand, R. O.	Minneapolis
Hannah, H. B.	Minneapolis
Hansen, C. O.	Minneapolis
Hansen, E. W.	Minneapolis
Hansen, Olga S.	Minneapolis
Hanson, H. J.	Minneapolis
Hanson, H. V.	Minneapolis
Hanson, W. A.	Minneapolis
*Hare, E. R.	Minneapolis
Harrington, C. D.	Minneapolis
Harrington, F. E.	Minneapolis

* Deceased.

Hart, V. L.	Minneapolis	Lyon, E. P.	Minneapolis	Reynolds, J. S.	Minneapolis
Hartzell, T. B.	Minneapolis	Lysne, Henry	Minneapolis	Rice, C. O.	Minneapolis
Hastings, D. R.	Minneapolis	MacDonald, A. E.	Minneapolis	Richardson, F. S.	Minneapolis
Haugen, J. A.	Minneapolis	MacDonald, D. A.	Minneapolis	Richdorf, L. F.	Minneapolis
Haverfield, Addie R.	Minneapolis	MacDonald, I. C.	Minneapolis	Rigler, L. G.	Minneapolis
Hawkinson, R. P.	Robbinsdale	Mach, F. B.	Minneapolis	Rishmiller, J. H.	Minneapolis
Hayes, J. M.	Minneapolis	Macnie, J. S.	Minneapolis	Rizer, R. I.	Minneapolis
Head, D. P.	Minneapolis	Maland, C. O.	Minneapolis	Roan, C. M.	Minneapolis
Head, G. D.	Minneapolis	Mann, A. T.	Minneapolis	Robb, E. F.	Minneapolis
Hedback, A. E.	Minneapolis	Marcley, W. J.	Minneapolis	Roberts, T. S.	Minneapolis
Hedding, J. A.	Minneapolis	Mariette, E. S.	Oak Terrace	Roberts, W. B.	Minneapolis
Heim, R. R.	Minneapolis	Mark, D. B.	Minneapolis	Robitshek, E. C.	Minneapolis
Helk, H. H.	Minneapolis	Matchan, G. R.	Minneapolis	Schaefer, W. E.	Minneapolis
Hendrickson, J. F.	Minneapolis	Matthews, Justus	Minneapolis	Rodda, F. C.	Minneapolis
Henry, C. E.	Minneapolis	Mattill, P. M.	Oak Terrace	Rodgers, C. L.	Minneapolis
Henry, M. O.	Minneapolis	Mattson, Hamlin	Minneapolis	Rosen, Samuel	Minneapolis
Herbolsheimer, A. J.	Minneapolis	Maxeiner, S. R.	Minneapolis	Rosenwald, R. M.	Minneapolis
Herman, A. L.	Minneapolis	May, W. H.	Minneapolis	Rucker, C. W.	Minneapolis
Hesdorffer, M. B.	Minneapolis	McCarthy, Donald	Minneapolis	Rucker, W. H.	Minneapolis
Hiebert, J. P.	Minneapolis	McCartney, J. S.	Minneapolis	Rud, N. C.	Minneapolis
Higgins, J. H.	Minneapolis	McDaniel, Orianna	Minneapolis	Rudell, G. L.	Minneapolis
Hill, Eleanor J.	Minneapolis	McEachran, A.	Minneapolis	Rupp, Alice	Minneapolis
Hirschfeld, A. D.	Minneapolis	McFarland, A. H.	Minneapolis	Russett, A. N.	Minneapolis
Hirshfield, F. R.	Minneapolis	McGandy, R. F.	Minneapolis	Rusten, E. M.	Minneapolis
Hoaglund, A. W.	Minneapolis	McGeary, G. E.	Minneapolis	Sadler, W. P.	Minneapolis
Hobbs, C. A.	Minneapolis	McInerney, Maurice	Minneapolis	Salt, C. G.	Minneapolis
Hodge, S. V.	Minneapolis	McIntyre, George	Minneapolis	Samuelson, Samuel	Minneapolis
Holl, P. M.	Minneapolis	McKinley, C. A.	Minneapolis	Sawatzky, W. A.	Minneapolis
Holt, W. B.	Minneapolis	McKinley, J. C.	Minneapolis	Schaaf, F. H. K.	Minneapolis
Howard, W. H.	Minneapolis	McKinney, F. S.	Minneapolis	Schaefer, W. G.	Minneapolis
Huenekens, E. J.	Minneapolis	McPheeters, H. O.	Minneapolis	Scheldrup, N. H.	Minneapolis
Hughes, L. D.	Minneapolis	McQuarrie, Irvine	Minneapolis	Schmitt, A. F.	Minneapolis
Hultkrans, R. E.	Minneapolis	Meland, E. L.	Minneapolis	Schmitt, S. C.	Minneapolis
Hurd, Annah	Minneapolis	Merkert, C. E.	Minneapolis	Schneider, J. P.	Minneapolis
Husband, M. W.	Minneapolis	Merkert, G. L.	Minneapolis	Schultz, P. J.	Minneapolis
Hymes, Charles	Minneapolis	Meyer, E. L.	Minneapolis	Schussler, O. F.	Minneapolis
Hynes, J. E.	Minneapolis	Michael, J. C.	Minneapolis	Schwartz, V. J.	Minneapolis
Irvine, H. G.	Minneapolis	Michelson, H. E.	Minneapolis	Schwytzer, Gustav	Minneapolis
Irwin, A. F.	Minneapolis	Miller, H. E.	Minneapolis	Scott, F. H.	Minneapolis
Jackson, C. M.	Minneapolis	Milton, J. S.	Minneapolis	Seashore, Gilbert	Minneapolis
Jennings, F. L.	Oak Terrace	Moe, J. H.	Minneapolis	Scham, Max	Minneapolis
Jennings, Mary H.	Minneapolis	Moen, J. K., Jr.	Minneapolis	Seifert, M. H.	Excelsior
Jensen, M. J.	Minneapolis	Moir, W. W.	Minneapolis	Selleseth, I. F.	Minneapolis
Johnson, A. B.	Minneapolis	Moorhead, Martha B.	Minneapolis	Shapiro, M. J.	Minneapolis
Johnson, A. E.	Minneapolis	Moriarty, Cecile R.	Minneapolis	Simons, Jalmar	Minneapolis
Johnson, H. A.	Minneapolis	Morrison, A. W.	Minneapolis	Simpson, E. D.	Minneapolis
Johnson, J. A.	Minneapolis	Morse, R. W.	Minneapolis	Sipenstein, D. M.	Minneapolis
Johnson, Julius	Minneapolis	Morton, H. McI.	Minneapolis	Sivertsen, Andrew	Minneapolis
Johnson, N. A.	Minneapolis	Murphy, I. J.	Minneapolis	Sivertsen, Ivar	Minneapolis
Johnson, Norman	Minneapolis	Murphy, Leo	Minneapolis	Skjold, A. C.	Minneapolis
Johnson, R. A.	Minneapolis	Myers, J. A.	Minneapolis	Smith, A. E.	Minneapolis
Johnson, S. M.	Minneapolis	Nathanson, M. H.	Minneapolis	Smith, A. M.	Minneapolis
Johnson, Y. T.	Minneapolis	Nelson, Harvey	Minneapolis	Smith, H. R.	Minneapolis
Jones, G. M.	Minneapolis	Nelson, H. S.	Minneapolis	Smith, N. M.	Minneapolis
Jones, H. W.	Minneapolis	Nelson, O. E.	Minneapolis	Soderlind, R. T.	Minneapolis
Jones, W. R.	Minneapolis	Newhart, Horace	Minneapolis	Solhaug, S. B.	Minneapolis
Kalin, O. T.	Minneapolis	Nordin, G. T.	Minneapolis	Spano, J. P.	Minneapolis
Kelby, G. M.	Minneapolis	Nordland, Martin	Minneapolis	Spratt, C. N.	Minneapolis
Kennedy, C. C.	Minneapolis	Noth, H. W.	Minneapolis	Stelter, L. A.	Minneapolis
Kennedy, Jane F.	Minneapolis	Nystrom, Ruth	Minneapolis	Stenstrom, Annette T.	Minneapolis
Kennedy, R. R.	Minneapolis	Oberg, C. M.	Minneapolis	Stewart, C. A.	Minneapolis
Kertesz, G.	Minneapolis	O'Brien, W. A.	Minneapolis	Stewart, R. L.	Minneapolis
Kibbe, O. A.	Minneapolis	O'Donnell, J. E.	Minneapolis	Stomel, Joseph	Minneapolis
King, E. A.	Minneapolis	Olson, F. A.	Minneapolis	Strachauer, A. C.	Minneapolis
King, Harry T.	Minneapolis	Olson, O. A.	Minneapolis	Strout, E. S.	Minneapolis
Kinsella, T. J.	Oak Terrace	Olson, R. G.	Minneapolis	Sundt, Mathias	Minneapolis
Kistler, A. J.	Minneapolis	Oppen, E. G.	Minneapolis	Swanson, Cephas	Minneapolis
Kistler, C. M.	Minneapolis	Owre, Oscar	Minneapolis	Swanson, R. E.	Minneapolis
Koepecke, G. M.	Minneapolis	Parks, A. H.	Minneapolis	Sweetser, H. B., Jr.	Minneapolis
Koller, H. M.	Minneapolis	Patterson, W. E.	Minneapolis	Sweetser, H. B., Sr.	Minneapolis
Koller, L. R.	Minneapolis	Paulsen, E. L.	Minneapolis	Sweetser, T. H.	Minneapolis
Kucera, F. J.	Hopkins	Pearce, N. O.	Minneapolis	Switzer, S. E.	Minneapolis
Kucera, W. J.	Minneapolis	Pederson, Harold	Minneapolis	Swendseen, C. G.	Minneapolis
Lajoie, J. M.	Minneapolis	Pederson, R. M.	Minneapolis	Tanner, A. C.	Minneapolis
Lapierre, A. P.	Minneapolis	Pennington, Reuben	Minneapolis	Taylor, Rood	Minneapolis
Lapierre, C. A.	Minneapolis	Peppard, T. A.	Minneapolis	Ternstrom, O. H.	Minneapolis
Lapierre, J. T.	Minneapolis	Perry, R. St. J.	Minneapolis	Thomas, G. E.	Minneapolis
Larsen, F. W.	Minneapolis	Petersen, Thorvald	Minneapolis	Thomas, G. J.	Minneapolis
Larson, C. M.	Minneapolis	Peterson, H. W.	Minneapolis	Tingdale, A. C.	Minneapolis
Larson, L. M.	Minneapolis	Peterson, N. P.	Minneapolis	Tunstead, H. J.	Minneapolis
Laurent, A. A.	Minneapolis	Peterson, O. H.	Minneapolis	Turncliffe, D. D.	Minneapolis
LaVake, R. T.	Minneapolis	Peterson, W. C.	Minneapolis	Tyrrill, C. C.	Minneapolis
Lazar, H. L.	Minneapolis	Petit, L. J.	Minneapolis	Ude, W. H.	Minneapolis
Leavitt, H. H.	Minneapolis	Pettit, C. W.	Minneapolis	Ulrich, H. L.	Minneapolis
Lebowski, J. A.	Minneapolis	Pfunder, M. C.	Minneapolis	Undine, C. A.	Minneapolis
Leland, H. R.	Minneapolis	Phelps, K. A.	Minneapolis	Urner, J. A.	Minneapolis
Leland, M. N.	Minneapolis	Platou, E. S.	Minneapolis	Vik, A. E.	Minneapolis
Leonard, L. J.	Minneapolis	Pollard, D. W.	Minneapolis	Voyer, E. O.	Minneapolis
Levine, N. M.	Minneapolis	Pollock, D. K.	Minneapolis	Wahlquist, H. F.	Minneapolis
Lillehei, E. J.	Robbinsdale	Polzak, J. A.	Minneapolis	Waldron, C. W.	Minneapolis
Lind, C. J.	Minneapolis	Poppe, F. H.	Minneapolis	Wall, C. R.	Minneapolis
Lindquist, R. H.	Minneapolis	Pratt, F. J.	Minneapolis	Wangensteen, O. H.	Minneapolis
Linner, H. P.	Minneapolis	Pratt, J. A.	Minneapolis	Wanous, E. Z.	Minneapolis
Linton, W. B.	Minneapolis	Preine, I. A.	Minneapolis	Ward, A. W.	Minneapolis
Lipschultz, Oscar	Minneapolis	Prim, J. A.	Minneapolis	Ward, P. A.	Minneapolis
Litman, A. B.	Minneapolis	Proshok, C. E.	Minneapolis	Warham, T. T.	Minneapolis
Litzenberg, J. C.	Minneapolis	Quinby, T. F.	Minneapolis	Watson, J. A.	Minneapolis
Logfeil, R. C.	Minneapolis	Quist, H. W.	Minneapolis	Webb, R. C.	Minneapolis
Long, Jesse	Minneapolis	Rasmussen, R. C.	Minneapolis	Weisman, S. A.	Minneapolis
Loomis, E. A.	Minneapolis	Reed, C. A.	Minneapolis	Westman, R. T.	Minneapolis
Lundblad, R. A.	Minneapolis	Regnier, E. A.	Minneapolis	Wethall, A. G.	Minneapolis
Lynch, M. J.	Minneapolis	Reimann, H. A.	Minneapolis	Wetherby, Macnider	Minneapolis

Weum, T. W. Minneapolis
 White, S. M. Minneapolis
 White, W. D. Minneapolis
 Widen, W. F. Minneapolis
 Wiese, H. F. B. Minneapolis
 Wilcox, A. E. Minneapolis
 Wilder, R. L. Minneapolis
 Wilken, P. A. Minneapolis
 Willcutt, C. E. Minneapolis

Williams, H. L., Jr. Minneapolis
 Williams, Robert Minneapolis
 Winther, Nora M. C. Minneapolis
 Witham, C. A. Minneapolis
 Wittich, F. W. Minneapolis
 Wohlrahe, A. A. Minneapolis
 Wohlrahe, C. F. Minneapolis
 Wood, D. F. Minneapolis
 Woodworth, Elizabeth Minneapolis

Wright, C. B. Minneapolis
 Wright, C. D. Minneapolis
 Wright, F. R. Minneapolis
 Wynne, H. M. N. Minneapolis
 Ylvisaker, R. S. Minneapolis
 Yoerg, O. W. Minneapolis
 Zaworski, E. A. Minneapolis
 Zierold, A. A. Minneapolis
 Ziskin, Thomas Minneapolis

KANDIYOHI-SWIFT-MEEKER COUNTY MEDICAL SOCIETY

Regular meetings, Monthly at Call
 Annual meeting, December
 Number of Members: 32

President
 Danielson, K. A. Litchfield
 Secretary
 Scofield, C. L. Benson
 Anderson, R. E. Willmar
 Arnsen, J. N. Benson
 Behmler, F. W. Appleton
 Branton, A. F. Willmar
 Ford, B. J. Willmar
 Brigham, Frank Watkins

Daignault, Oscar Benson
 Danielson, K. A. Litchfield
 Danielson, Lennox Litchfield
 Dowswell, W. J. Kerkhoven
 Dulude, S. S. Dassel
 Edwards, G. C. Grove City
 Fiksdal, M. J. Willmar
 Fredrickson, Alice C. Lake Lillian
 Fredrickson, G. U. Y. Lake Lillian
 Frisch, F. P. Willmar
 Frost, E. H. Willmar
 Giere, S. W. Benson
 Hodapp, R. J. Willmar

Hutchinson, Henry New London
 Jacobs, J. C. Willmar
 Jensen, H. H. Atwater
 Johnson, Hans Kerkhoven
 Kaufman, W. C. Appleton
 Macklin, W. E., Jr. Litchfield
 O'Connor, D. C. Eden Valley
 Rains, J. M. Willmar
 Scofield, C. L. Benson
 Smith, B. F. Willmar
 Telford, V. J. Litchfield
 Thompson, Arthur Raymond
 Wilmot, H. E. Litchfield

LYON-LINCOLN COUNTY MEDICAL SOCIETY

Regular meetings, first Tuesday of month
 Annual meeting, October
 Number of Members: 21

President
 Purves, G. H. Russell
 Secretary
 Workman, H. M. Tracy
 Bossingham, O. N. Lake Benton
 Ford, B. C. Marshall
 Germa, Charles Balaton

Golden, C. M. Tyler
 Gray, F. D. Marshall
 Happe, L. J. Marshall
 Hermanson, P. E. Hendricks
 Hoidale, A. D. Tracy
 Jacquot, G. L. Marshall
 Nilson, H. J. Tracy
 Olson, A. O. Hendricks
 Persons, C. E. Marshall

Purves, G. H. Russell
 Robertson, J. B. Cottonwood
 Sanderson, E. T. Minneota
 Thordarson, Theodore Minneota
 Vadheim, A. L. Tyler
 Valentine, W. H. Tracy
 Workman, H. M. Tracy
 Workman, W. G. Tracy
 Yaeger, W. W. Ivanhoe

McLEOD COUNTY MEDICAL SOCIETY

Regular meetings, once in three months
 Annual meeting, January
 Number of Members: 16

President
 Klima, W. W. Stewart
 Secretary
 Lippmann, E. W. Hutchinson
 Clement, J. B. Lester Prairie

Crow, E. R. Arlington
 Holm, H. H. Glencoe
 Jensen, A. H. Hutchinson
 Klima, W. W. Stewart
 Langhoff, A. H. Glencoe
 Lippmann, E. W. Hutchinson
 McMahon, M. J. Green Isle
 Ninneman, N. N. Silver Lake

Rempel, D. D. Brownston
 Sahr, W. G. Hutchinson
 Schmidt, W. R. Glencoe
 Scholpp, O. W. Hutchinson
 Sheppard, Fred. Hutchinson
 Sheppard, P. E. Hutchinson
 Trutna, T. J. Silver Lake

MOWER COUNTY MEDICAL SOCIETY

Regular meetings, last Thursday of Month
 Annual meeting, last Thursday in November
 Number of Members: 23

President
 Havens, J. G. W. Austin
 Secretary
 Robertson, P. A. Austin
 Allen, A. W. Austin
 Allen, C. C. Austin
 Coleman, F. B. Austin

Cronwell, B. J. Austin
 Flanagan, L. G. Austin
 Greene, H. H. Austin
 Grise, W. B. Austin
 Havens, J. G. W. Austin
 Hegge, O. H. Austin
 Hegge, R. S. Austin
 Henslin, A. E. Le Roy
 Hertel, G. F. Austin
 Leck, P. C. Austin

Lommen, P. A. Austin
 McKenna, J. K. Austin
 Melzer, G. R. Lyle
 Mitchell, R. S. Grand Meadow
 Morrow, J. J. Austin
 Rebman, E. C. Austin
 Robertson, P. A. Austin
 Schottler, G. J. Dexter
 Sheedy, C. L. Austin
 Thomson, J. M. Brownsdale

NICOLLET-LE SUEUR COUNTY MEDICAL SOCIETY

Regular meetings, January, April, Summer, October
 Annual Meeting, January
 Number of Members: 15

President
 Wolner, O. H. St. Peter
 Secretary
 Petersen, M. C. St. Peter
 Aitkins, H. B. Le Center

Covell, W. W. St. Peter
 Daniels, J. W. St. Peter
 Ericson, Swan Le Sueur
 Freeman, G. H. St. Peter
 Gully, R. J. St. Peter
 Hankerson, R. G. Elysian
 Holtan, Theodore Waterville

Kerschbaumer, Louisa St. Peter
 Kolars, J. I. Le Center
 Lenander, M. E. St. Peter
 McKeon, J. O. Montgomery
 Petersen, M. C. St. Peter
 Strathern, F. P. St. Peter
 Wolner, O. H. St. Peter

OLMSTED-HOUSTON-FILLMORE-DODGE COUNTY MEDICAL SOCIETY

Regular meetings, First Wednesday Every Odd Month
 Annual meeting, November
 Number of Members: 273

President
 Sanford, A. H. Rochester
 Secretary
 Piper, M. C. Rochester

Adams, R. T. Mantorville
 Adson, A. W. Rochester
 Albers, E. C. Rochester
 Allen, E. V. Rochester
 Allen, W. A. Rochester

Alvarez, W. C. Rochester
 Amberg, Samuel Rochester
 Anderson, C. M. Rochester
 Anderson, C. R. Rochester
 Anderson, M. J. Rochester

Anderson, N. E.	Harmony	Hallenbeck, D. F.	Rochester	Olson, P. F.	Rochester
Atkinson, Walter.	Rochester	Hamilton, W. S.	Rochester	Onsgard, L. K., Jr.	Houston
Baker, C. P.	Rochester	Hardwick, R. S.	Rochester	Onsgard, L. K., Sr.	Houston
Baker, H. R.	Hayfield	Harrington, S. W.	Rochester	Overton, L. M.	Rochester
Balfour, D. C.	Rochester	Harrison, P. W.	Worthington	Pace, J. McL.	Rochester
Bannick, E. G.	Rochester	Hartman, H. R.	Rochester	Parker, H. L.	Rochester
Barber, K. W.	Rochester	Havens, F. Z.	Rochester	Parker, R. L.	Rochester
Bargen, J. A.	Rochester	Hebert, W. H. J.	Rochester	Parkhill, Edith M.	Rochester
Barker, N. W.	Rochester	Heck, F. J.	Rochester	Pemberton, J. deJ.	Rochester
Barnes, A. R.	Rochester	Heilman, F. R.	Rochester	Peterson, V. L.	Rochester
Beaver, D. C.	Rochester	Helland, G. M.	Spring Grove	Pilcher, Frederick, Jr.	Rochester
Beiswanger, R. H.	Wykoff	Helland, J. W.	Spring Grove	Piper, M. C.	Rochester
Belote, G. B.	Caledonia	Helmholz, H. F.	Rochester	Plummer, H. S.	Rochester
Benedict, W. L.	Rochester	Hempstead, B. E.	Rochester	Plummer, W. A.	Rochester
Berkman, D. M.	Rochester	Hench, P. S.	Rochester	Pollock, L. W.	Rochester
Berkman, J. M.	Rochester	Henderson, M. S.	Rochester	Popp, W. C.	Rochester
Bigelow, C. E.	Dodge Center	Hewitt, Edith S.	Rochester	Porter, G. L.	Rochester
Binger, M. W.	Rochester	Hewitt, R. M.	Rochester	Powers, F. H.	Rochester
Blake, T. W.	Rochester	Heyerdale, O. C.	Rochester	Prangan, A. D.	Rochester
Boothby, W. M.	Rochester	Hill, E. M.	Rushford	Pricman, L. E.	Rochester
Bowing, H. H.	Rochester	Hines, E. A., Jr.	Rochester	Priestley, J. T.	Rochester
Braasch, W. F.	Rochester	Hinshaw, H. C.	Rochester	Quade, R. H.	Rochester
Brock, W. G.	Rochester	Hoerner, M. T.	Rochester	Quigley, M. W.	Caledonia
Broders, A. C.	Rochester	Horton, B. T.	Rochester	Raaf, J. E.	Rochester
Brown, A. E.	Rochester	Howell, L. P.	Rochester	Randall, L. M.	Rochester
Brown, G. E.	Rochester	Hyde, T. L.	Rochester	Rivers, A. B.	Rochester
Brown, P. W.	Rochester	Imes, P. R.	Rochester	Robertson, H. E.	Rochester
Brunsting, L. A.	Rochester	Johnson, R. B.	Lanesboro	Robins, C. R., Jr.	Rochester
Buie, L. A.	Rochester	Joyce, G. L.	Stewartville	Robinson, L. W.	Rochester
Bumpus, H. C.	Rochester	Joyce, G. T.	Rochester	Rosenow, E. C.	Rochester
Burch, H. A.	Rochester	Judd, E. S.	Rochester	Ryneearson, E. H.	Rochester
Butsch, W. L.	Rochester	Judd, W. H.	Rochester	Sanford, A. H.	Rochester
Cabot, C. M.	Rochester	Keith, N. M.	Rochester	Scherer, R. G.	Rochester
Cabot, Hugh.	Rochester	Kennedy, R. L. J.	Rochester	Sheldon, W. D.	Rochester
Camp, J. D.	Rochester	Kepler, E. J.	Rochester	Slavens, J. J.	Rochester
Canfield, W. W.	Houston	Kernohan, J. W.	Rochester	Slocumb, C. H.	Rochester
Church, G. T.	Rochester	Keyes, H. C.	Rochester	Smith, F. D.	Kasson
Clifton, T. A.	Chatfield	Kirklin, B. R.	Rochester	Smith, F. L.	Rochester
Coate, J. D.	Rochester	Kirklin, O. L.	Rochester	Smith, H. L.	Rochester
Collins, D. C.	Rochester	Kilbourne, A. F.	Rochester	Smith, N. D.	Rochester
Comfort, M. W.	Rochester	Koelsche, G. A.	Rochester	Snell, A. M.	Rochester
Connor, H. M.	Rochester	Kroeze, R. G.	Rochester	Stacy, L. J.	Rochester
Cook, E. N.	Rochester	Lannin, J. C.	Mabel	Stafne, W. A.	Rochester
Costello, R. T.	Rochester	Larson, P. N.	Rochester	Stark, W. B.	Rochester
Counseller, V. S.	Rochester	Leddy, E. T.	Rochester	Starkey, T. A.	Rochester
Cragg, R. W.	Rochester	Lemon, W. S.	Rochester	Steven, George.	Byron
Craig, W. McK.	Rochester	Lendrum, F. C.	Rochester	Stevens, G. A. W.	Rochester
Crenshaw, J. L.	Rochester	Lester, G. L.	Rochester	Stuart, F. A., Jr.	Rochester
Crew, J. E.	Rochester	Lillie, H. I.	Rochester	Stuck, W. G.	Rochester
Curry, F. S.	Rochester	Lochead, D. C.	Rochester	Stuhler, L. G.	Rochester
Darnall, C. M.	Rochester	Logan, A. H.	Rochester	Sullivan, R. R.	Rochester
Davis, A. C.	Rochester	Love, J. G.	Rochester	Sutherland, C. G.	Rochester
Davis, I. G.	Rushford	Luden, Georgine, Victoria, B. C., Can.		Sutton, L. F.	Mazeppa
Davis, P. L.	Rochester	Lundy, J. S.	Rochester	Swart, H. A.	Rochester
Deacon, A. E.	Rochester	Magath, T. B.	Rochester	Teall, R. C.	Rochester
Desjardins, A. U.	Rochester	Magee, H. R.	Rochester	Thiessen, N. W.	Rochester
Dixon, C. F.	Rochester	Magiera, Estelle A.	Rochester	Thompson, G. J.	Rochester
Dolder, F. C.	Eyota	Maisel, J. J.	Rochester	Tovell, R. M.	Rochester
Dorsey, J. M.	Rochester	Malerich, J. A.	Caledonia	Trenouth, S. M.	Rochester
Drake, F. A.	Lanesboro	Mann, F. C.	Rochester	Tuohy, E. B.	Rochester
Drenckhahn, C. H.	Rochester	Marble, W. P.	Rochester	Vinson, P. P.	Rochester
Drips, D. G.	Rochester	Mason, P. B.	Rochester	Voldeng, K. E.	Rochester
Dunlop, J. G., Jr.	Rochester	Massey, B. D.	Rochester	Voris, H. C.	Rochester
Eaton, L. McK.	Rochester	Masson, D. M.	Rochester	Wagner, H. P.	Rochester
Edward, George.	Canton	Masson, J. C.	Rochester	Waldron, G. W.	Rochester
Emmett, J. L.	Rochester	Mayo, C. H.	Rochester	Walters, Waltman	Rochester
Eusterman, G. B.	Rochester	Mayo, C. W.	Rochester	Ward, C. E.	Rochester
Evarts, A. B.	Rochester	Mayo, J. G.	Rochester	Watkins, C. H.	Rochester
Faber, J. E.	Rochester	Mayo, W. J.	Rochester	Watson, J. R.	Rochester
Fawcett, C. E.	Stewartville	Maytum, C. K.	Rochester	Waugh, J. M.	Rochester
Figi, F. A.	Rochester	McCarty, W. C.	Rochester	Weber, H. M.	Rochester
Foster, R. F.	Rochester	McCormack, C. J.	Rochester	Weir, J. F.	Rochester
Fricke, R. E.	Rochester	McKaig, C. B.	Pine Island	Wellbrock, W. L. A.	Rochester
Gaarde, F. W.	Rochester	McRoberts, J. W.	Rochester	Welsh, A. L.	Rochester
Garvin, R. O.	Rochester	Meyerding, H. W.	Rochester	Wesson, H. R.	Rochester
Ghormley, R. K.	Rochester	Millet, R. F.	Rochester	Wherry, F. P., Jr.	Rochester
Gianturco, Cesare.	Rochester	Mills, S. D.	Rochester	Wilbur, D. L.	Rochester
Gibson, G. G.	Rochester	Moersch, F. P.	Rochester	Wilder, R. M.	Rochester
Giffin, H. Z.	Rochester	Moersch, H. J.	Rochester	Williams, R. V.	Rushford
Gilpin, S. F., Jr.	Rochester	Montgomery, Hamilton	Rochester	Willis, F. A.	Rochester
Goldsmith, Grace A.	Rochester	Murray, S. E.	Rochester	Wilson, L. B.	Rochester
Goodwin, T. W.	Rochester	Mussey, R. D.	Rochester	Woltman, H. W.	Rochester
Gray, H. K.	Rochester	Nass, H. A.	Mabel	Wood, G. T., Jr.	Rochester
Griffin, A. M.	Rochester	Nehring, J. P.	Preston	Wood, H. G.	Rochester
Grinnell, W. B.	Preston	New, G. B.	Rochester	Woodruff, C. W.	Chatfield
Habein, H. C.	Rochester	Ochsner, H. C.	Rochester	Youngerman, W. M.	Rochester
Haines, S. F.	Rochester	O'Leary, P. A.	Rochester	Zellhoefer, H. W. K.	Rochester
Hale, D. E.	Rochester	Olson, E. A.	Pine Island		

PARK REGION DISTRICT AND COUNTY MEDICAL SOCIETY

Otter Tail, Grant, Wilkin and Douglas Counties
 Regular meetings, Second Wednesday of January, April, July and October
 Annual meeting, Second Wednesday of October
 Number of Members: 36

President	Boline, C. A.	Battle Lake	Hand, W. R.	Elbow Lake
Heiberg, E. A.	Fergus Falls	Boysen, Peter.	Alexandria	
Secretary	Broker, W. S.	Battle Lake	Heiberg, E. A.	Fergus Falls
Nelson, W. I.	Underwood	Burnap, W. L.	Fergus Falls	Howard, Laura K.
Baker, A. C.	Fergus Falls	Combacker, L. C.	Fergus Falls	Jacobs, G. C.
Baker, N. H.	Fergus Falls	Drought, W. W.	Fergus Falls	Johnson, O. V.
		Esser, John.	Perham	Kemp, M. W.
		Estrem, C. O.	Fergus Falls	Kierland, P. E.
				Alexandria

Lee, W. A. Fergus Falls
Leibold, H. H. Parkers Prairie
Lewis, A. J. Henning
Love, F. A. Carlos
Meckstroth, C. W. Brandon
Naegeli, Frank. Fergus Falls

Nelson, O. N. Battle Lake
Nelson, W. I. Underwood
Parson, L. R. Elbow Lake
Paulson, T. S. Fergus Falls
Satersmoen, Theodore. Pelican Rapids
Sather, E. R. Alexandria

Serkland, J. C. Rothsay
Stafford, C. E. Dent
Tanquist, E. J. Alexandria
Vail, J. B. Henning
Windsor, R. L. Rothsay
Wray, W. E. Campbell

RAMSEY COUNTY MEDICAL SOCIETY

Regular meetings, last Monday in every month excepting June, July and August

Annual meeting, last Monday in January

Number of Members: 305

President
Plondke, F. J. St. Paul

Secretary
Schulze, A. G. St. Paul

Abbott, J. S. St. Paul
Ahrens, A. E. St. Paul
Ahrens, A. H. St. Paul
Alberts, M. W. St. Paul
Alden, J. F. St. Paul
Alexander, F. H. St. Paul
Armstrong, J. M. St. Paul
Arnquist, A. S. St. Paul
Aurelius, J. R. St. Paul
Ausman, C. F. St. Paul
Backus, A. S. St. Paul
Bacon, D. K. St. Paul
*Bacon, Knox. San Diego, Calif.
Bacon, L. C. St. Paul
Barry, L. W. St. Paul
Barsness, Nellie. St. Paul
Beadie, W. D. Cannon Falls
Beals, Hugh. St. Paul
Bell, C. C. St. Paul
Benepe, J. L. St. Paul
Bennion, P. H. St. Paul
Bentley, N. P. St. Paul
Berrisford, P. D. St. Paul
Bicek, J. F. St. Paul
Binger, H. E. St. Paul
Birnberg, T. L. St. Paul
Bock, R. A. St. Paul
Boeckmann, Egil. St. Paul
Bohland, E. H. St. Paul
Bolender, H. L. St. Paul
Borg, J. F. St. Paul
Bouma, L. R. St. Paul
Brand, G. D. St. Paul
Bray, E. R. St. Paul
Briggs, J. F. St. Paul
Brodie, W. D. St. Paul
Brown, E. I. St. Paul
Brown, J. C. St. Paul
Burch, F. E. St. Paul
Burfiend, G. H. St. Paul
Burns, R. M. St. Paul
Burton, C. G. St. Paul
Bushier, H. H. St. Paul
Caldwell, J. P. St. Paul
Caldwell, K. S. St. Paul
Campbell, J. E. South St. Paul
Carroll, W. C. St. Paul
Carter, F. G. St. Paul
Chatterton, C. C. St. Paul
Christiansen, A. St. Paul
Christison, J. T. St. Paul
Clark, T. C. Minneapolis
Colby, Woodard. St. Paul
Cole, W. H. St. Paul
Collie, H. G. St. Paul
Colvin, A. R. St. Paul
Connor, C. E. St. Paul
Countryman, R. S. St. Paul
Cowen, E. W. North St. Paul
Critchfield, L. R. St. Paul
Crump, J. W. St. Paul
Culligan, J. M. St. Paul
Dack, L. G. St. Paul
Darling, J. B. St. Paul
Daugherty, E. B. St. Paul
Daugherty, L. E. St. Paul
Davis, Herbert. St. Paul
Davis, William. St. Paul
Dedolph, Karl. St. Paul
Derauf, B. I. St. Paul
Dickson, T. H., Jr. St. Paul
Dittman, G. C. St. Paul
Donohue, P. F. St. Paul
Dovre, C. M. St. Paul
Drake, C. B. St. Paul
Dunn, J. N. St. Paul
Earl, G. A. St. Paul
Earl, R. O. St. Paul
Edlund, G. St. Paul
Ely, O. S. South St. Paul

Emerson, F. C. St. Paul
Endress, E. K. St. Paul
Engberg, E. J. St. Paul
Ernest, G. C. South St. Paul
Eshelby, E. C. St. Paul
Fahey, E. W. St. Paul
Ferguson, J. C. St. Paul
Fesler, H. H. St. Paul
Flanagan, H. F. St. Paul
Fogarty, C. W. St. Paul
Fogelberg, E. J. St. Paul
Foley, F. E. B. St. Paul
Freeman, C. D. St. Paul
Gager, E. C. St. Paul
Garbrecht, Arthur. St. Paul
Gardiner, D. G. St. Paul
Gardner, W. P. St. Paul
Geer, E. K. St. Paul
Gehlen, J. N. St. Paul
Geist, G. A. St. Paul
Ghent, C. H. St. Paul
Ghent, M. M. St. Paul
Gibbs, E. C. St. Paul
Gilfillan, J. S. St. Paul
Ginsberg, William. St. Paul
Goltz, E. V. St. Paul
Grant, H. W. St. Paul
Gratzek, Thomas. St. Paul
Gruenhagen, A. P. St. Paul
Hagaman, G. K. St. Paul
Hall, A. R. St. Paul
Hall, H. H. St. Paul
Hammes, E. M. St. Paul
Hammond, J. F. St. Paul
Harmon, G. E. St. Paul
Hartfiel, W. F. St. Paul
Hartley, E. C. St. Paul
Hauser, V. P. St. Paul
Hawkins, V. J. St. Paul
Heck, W. W. St. Paul
Hedstrom, F. G. St. Paul
Hengstler, W. H. St. Paul
Hensel, C. N. St. Paul
Heron, R. C. St. Paul
Herrmann, E. T. St. Paul
Hesselgrave, S. S. St. Paul
Hilger, A. W. St. Paul
Hilger, D. D. St. Paul
Hilger, L. A. St. Paul
Hochlizer, J. J. St. Paul
Hoff, Alfred. St. Paul
Hoffman, M. H. St. Paul
Holcomb, J. T. St. Paul
Holcomb, O. W. St. Paul
Holt, J. E. St. Paul
Howard, W. S. St. Paul
Hultkrans, J. C. St. Paul
Ide, A. W. St. Paul
Ikeda, Kano. St. Paul
Johnson, A. M. St. Paul
Johnson, J. A. St. Paul
Johnson, R. G. St. Paul
Johnson, T. H. San Francisco, Calif.
Jones, D. C. St. Paul
Jones, E. M. St. Paul
Kadesky, David. St. Paul
Kamman, G. R. St. Paul
Kannary, E. L. St. Paul
Kasper, E. M. St. Paul
Kelly, J. V. St. Paul
Kelly, P. H. St. Paul
Kenefick, E. V. St. Paul
Kennedy, W. A. St. Paul
Kesting, Herman. St. Paul
King, G. L. St. Paul
King, Z. P. St. Paul
Klein, H. N. St. Paul
Knauff, M. K. St. Paul
Kvitrud, Gilbert. St. Paul
Langenderfer, F. V. St. Paul
Larsen, C. L. St. Paul
Lax, M. H. St. Paul
Leahy, Bartholomew. St. Paul
Leavenworth, R. O. St. Paul
Leitch, Archibald. St. Paul
Leonard, G. J. St. Paul
Lepak, J. A. St. Paul
Lerche, William. Cable, Wis.
Leven, N. L. St. Paul
Levin, Bert. St. Paul

Lewis, W. W. St. Paul
Lick, C. L. St. Paul
Lippman, H. S. St. Paul
Little, W. J. St. Paul
Lowe, E. R. South St. Paul
Lowe, T. A. South St. Paul
Lundholm, A. M. St. Paul
Madden, J. F. St. Paul
Martineau, J. L. St. Paul
Mattson, C. H. St. Paul
McBeath, E. C. St. Paul
McCarthy, J. J. St. Paul
McCarthy, W. R. St. Paul
McClanahan, J. H. White Bear
McClanahan, T. S. White Bear
McCloud, C. N. St. Paul
McKeon, Owen. St. Paul
McLaren, Jeannette M. St. Paul
McNevin, C. F. St. Paul
Meade, J. R. St. Paul
Meyerding, E. A. St. Paul
Moga, J. A. St. Paul
Mogilner, S. N. St. Paul
Molander, H. A. St. Paul
Moquin, Marie A. St. Paul
Moran, T. R. St. Paul
Morrissey, F. B. St. Paul
Mortenson, N. G. St. Paul
Moss, M. N. St. Paul
Moynihan, T. J. St. Paul
Muller, R. T. St. Paul
Myers, Thomas. St. Paul
Naegeli, A. E. St. Paul
Neher, F. H. St. Paul
Nelson, L. A. St. Paul
Nippert, H. T. St. Paul
Noble, J. F. St. Paul
Nordin, C. G. St. Paul
Nye, Katherine A. St. Paul
Nye, Lillian L. St. Paul
O'Connor, L. J. St. Paul
Oerting, Harry. St. Paul
Ogden, Warner. St. Paul
Ohage, Justus. St. Paul
Ohage, Justus, Jr. St. Paul
Olson, C. A. St. Paul
O'Reilly, B. E. St. Paul
Ostergren, E. W. St. Paul
Ouelette, A. J. St. Paul
Page, C. V. St. Paul
Pearson, F. R. St. Paul
Pedersen, A. H. St. Paul
Perry, C. G. St. Paul
Peterson, D. B. St. Paul
Peterson, J. L. E. St. Paul
Peterson, V. N. St. Paul
Plondke, F. J. St. Paul
Prendergast, H. J. St. Paul
Ramsey, W. R. St. Paul
Richards, E. T. F. St. Paul
Richardson, H. E. St. Paul
Ritchie, H. P. St. Paul
Rogers, F. D. St. Paul
Rogers, S. F. St. Paul
Rosenberger, H. P. St. Paul
Rosenholtz, Burton. St. Paul
Rosenthal, Robert. St. Paul
Rothrock, J. L. St. Paul
Rothschild, H. J. St. Paul
Roy, Philemon. St. Paul
Ruhberg, G. N. St. Paul
Rutherford, W. C. St. Paul
Ryan, J. J. St. Paul
Ryan, J. M. St. Paul
Ryan, M. E. St. Paul
Satterlund, V. L. St. Paul
Savage, F. J. St. Paul
Schoch, R. B. St. Paul
Schons, Edward. St. Paul
Schuldt, F. C. St. Paul
Schulze, A. G. St. Paul
Schwyzer, Arnold. St. Paul
Scott, E. E. St. Paul
Senkler, G. E. St. Paul
Setzer, H. J. St. Paul
Shannon, W. R. St. Paul
Shellman, J. L. St. Paul
Shillington, M. A. St. Paul
Short, Jacob. St. Paul
Singer, B. J. St. Paul

*Deceased.

Skinner, H. O. St. Paul
 Smisek, E. A. St. Paul
 Snyder, G. W. St. Paul
 Sohlberg, O. I. St. Paul
 Souster, B. B. St. Paul
 Sprafka, J. M. St. Paul
 Steinberg, C. L. St. Paul
 Sterner, E. G. St. Paul
 Stevens, F. A. Lake Elmo
 Stewart, Alexander. St. Paul
 Stinnette, S. E. St. Paul
 Stoeckmann, A. E. St. Paul
 Strate, G. E. St. Paul
 Swanson, E. O. St. Paul
 Swanson, J. A. St. Paul

Swendson, J. J. St. Paul
 Teisberg, C. B. St. Paul
 Thompson, F. A. St. Paul
 Tift, C. R. St. Paul
 Tregilgas, H. R. South St. Paul
 Van Slyke, C. A. St. Paul
 Veirs, Dean. St. Paul
 Veirs, Ruby S. St. Paul
 Von der Weyer, William. St. Paul
 Waas, C. W. St. Paul
 Warnock, R. W. St. Paul
 Warren, E. L. St. Paul
 Watz, C. E. St. Paul
 Webber, F. L. St. Paul
 Welch, M. C. St. Paul

Werner, O. S. Cambridge
 Wheeler, M. W. St. Paul
 Whitacre, J. C. St. Paul
 Whitmore, Frank. St. Paul
 Williams, C. K. St. Paul
 Williamson, G. A. St. Paul
 Wilson, J. A. St. Paul
 Wilson, J. V. St. Paul
 Winnick, J. B. St. Paul
 Wold, C. K. St. Paul
 Wolfe, H. H. St. Paul
 Wolff, H. J. St. Paul
 Youngren, E. R. St. Paul
 Zander, C. H. St. Paul
 Zimmermann, H. B. St. Paul

RED RIVER VALLEY MEDICAL SOCIETY

Kittson, Mahnomen, Marshall, Norman, Pennington, Polk, Red Lake

and Roseau Counties

Regular meetings, second Tuesday, April, October and December

Annual meeting, second Tuesday, December

Number of Members: 57

President
 Blegen, H. M. Warren
 Secretary
 Oppegaard, C. L. Crookston

Adkins, C. M. Thief River Falls
 Anderson, W. S. Minneapolis
 Benson, T. O. East Grand Forks
 Berge, D. O. Roseau
 Bernard, B. C. Thief River Falls
 Bertelson, O. L. Crookston
 Biedermann, Jacob. Thief River Falls
 Blegen, H. M. Warren
 Bohl, G. W. Ada
 Bratrud, O. E. Thief River Falls
 Brown, L. L. Crookston
 Button, A. J. Pine River
 Carlson, A. E. Warren
 Carlson, C. E. Stephen
 Culver, L. G. Thief River Falls

Delmore, J. L. Roseau
 Erickson, Eskil. Halstad
 Evans, V. L. Thief River Falls
 Froats, C. W. Thief River Falls
 Griffin, P. J. Fertile
 Hansen, Marius. Ada
 Haugseth, Enoch. Twin Valley
 Henney, W. H. McIntosh
 Hodgson, H. H. Crookston
 Hollands, W. H. Fisher
 Holmstrom, C. H. Warren
 Holte, Halvor. Crookston
 Kahala, Arthur. Crookston
 Kirk, G. P. East Grand Forks
 Knutson, G. A. Greenbush
 Leitch, N. M. Warroad
 Locken, O. E. Crookston
 Lynde, O. G. Thief River Falls
 Melby, O. F. Thief River Falls
 Mercil, W. F. Crookston
 Morley, G. A. Crookston

Nelson, H. E. Crookston
 Norman, J. F. Crookston
 Ohnstad, J. L. McIntosh
 Oppegaard, C. L. Crookston
 Oppegaard, M. O. Crookston
 Overend, K. V. Hallock
 Paradis, W. G. Crookston
 Parsons, J. G. Crookston
 Reff, A. R. Crookston
 Roy, J. A. Red Lake Falls
 Shaleen, A. W. Hallock
 Shedlov, Abraham. Fosston
 Smith, A. M. Thief River Falls
 Stocking, F. F. Hallock
 Stuurmanns, S. H. Erskine
 Swedenburg, A. W. Thief River Falls
 Torgerson, W. B. Oklee
 Turnbull, Robert. Fosston
 Watson, N. M. Red Lake Falls
 Weed, V. A. Red Lake Falls
 Wilttrout, I. G. Oslo

REDWOOD-BROWN COUNTY MEDICAL SOCIETY

Regular meetings, at call of President

Annual meeting, May

Number of Members: 30

President
 Fritsche, Albert. New Ulm

Secretary
 Meierding, W. A. New Ulm

Abraham, A. L. Gibbon
 Brey, F. W. Wabasso
 Dubbe, F. H. New Ulm
 Dysterheft, A. F. Gaylord
 Fritsche, Albert. New Ulm
 Fritsche, C. J. New Ulm

Gibbons, F. C. Comfrey
 Graham, W. D. Hanska
 Goblirsch, A. P. Sleepy Eye
 Hammermeister, T. F. New Ulm
 Hovde, Rolf. Winthrop
 Jamieson, Earl. Walnut Grove
 Johnson, W. E. Morgan
 Kolset, C. D. Sanborn
 Kusse, A. L. New Ulm
 Lindahl, M. J. Winthrop
 Meierding, W. A. New Ulm
 Nuessle, W. G. Springfield

Peterson, R. A. Vesta
 Reineke, G. F. New Ulm
 Rothenburg, J. C. Springfield
 Saffert, C. A. New Ulm
 Schoch, J. L. New Ulm
 Seifert, O. J. New Ulm
 Shrader, J. S. Hollandale
 Vogel, H. A. L. New Ulm
 Vogel, J. H. New Ulm
 Weiser, G. B. New Ulm
 Wellcome, J. W. B. Sleepy Eye
 Wohlrahe, E. J. Springfield

RENVILLE COUNTY MEDICAL SOCIETY

Number of Members: 17

President
 Brand, W. A. Redwood Falls

Secretary
 Dordal, J. Sacred Heart

Adams, R. C. Bird Island

Billings, R. E. Franklin
 Brand, W. A. Redwood Falls
 Byram, J. W. Echo
 Cole, H. B. Redwood Falls
 Cole, J. G. Redwood Falls
 Dordal, J. Sacred Heart
 Fawcett, A. M. Renville
 Flinn, T. E. Redwood Falls

Gains, E. C. Buffalo Lake
 Johnson, O. H. Redwood Falls
 Loenholdt, E. H. Hector
 Madland, R. S. Fairfax
 Mesker, G. H. Olivia
 Passer, A. A. Olivia
 Penhall, F. W. Morton
 Solsem, F. N. Sacred Heart

RICE COUNTY MEDICAL SOCIETY

Annual meeting, December

Number of Members: 40

President
 Murdoch, J. M. Faribault

Secretary
 Plonske, C. J. Faribault

Babcock, F. M. Northfield
 Beede, Ethel R. Faribault
 Davis, F. U. Faribault
 Dugan, L. F. Faribault
 Dugay, N. S. Northfield
 Engstrom, F. A. Wanamingo
 Francis, D. W. Faribault
 Hanson, A. M. Faribault

Huxley, F. R. Faribault
 Haessly, S. B. Faribault
 Haynes, A. L. Faribault
 Kanne, C. W. Faribault
 Kucera, S. T. Lonsdale
 Kuske, A. W. Faribault
 Lane, Laura A. Northfield
 Lende, Norman. Faribault
 Lexa, F. J. Lonsdale
 Lufkin, C. D. Northfield
 Mayland, M. L. Faribault
 Meyer, F. C. Kenyon
 Meyer, P. F. Faribault
 Moses, Joseph, Jr. Northfield
 Murdoch, J. M. Faribault
 Plonske, C. J. Faribault

Robilliard, C. M. Faribault
 Rohrer, C. A. Waterville
 Rudie, C. N. Kenyon
 Rumpf, C. W. Faribault
 Rumpf, W. H. Faribault
 Seeley, I. F. Northfield
 Smith, P. A. Faribault
 Stewart, Gwendolyn. Faribault
 Stiles, Angie G. Northfield
 Thorson, O. P. Northfield
 Traeger, C. A. Faribault
 Warren, F. S. Washington, D. C.
 Weaver, M. M. Northfield
 Wilkowske, R. J. Nerstrand
 Wilson, Warren. Northfield
 Wilson, W. E. Northfield

ST. LOUIS COUNTY MEDICAL SOCIETY
 Carlton, Cook, Itasca, Lake and St. Louis Counties
 Regular meeting, second Thursday every month
 Annual meeting, October
 Number of Members: 167

President	
Fischer, M. McC.	Duluth
Secretary	
Gillespie, M. G.	Duluth
Adams, B. S.	Hibbing
Akins, W. M.	Eveleth
Alexander, C. E.	Duluth
Armstrong, E. L.	Duluth
Athens, A. G.	Duluth
Ayres, G. T.	Ely
Bagley, Elizabeth C.	Duluth
Bagley, W. R.	Duluth
Bardon, Richard	Duluth
Barney, L. A.	Duluth
Berdez, G. L.	Duluth
Bergquist, K. E.	Duluth
Bianco, A. J.	Duluth
Binet, H. E.	Grand Rapids
Birkland, O. N.	Hibbing
Blacklock, S. S.	Hibbing
Blakely, C. C.	Barnum
Boman, P. G.	Duluth
Boyer, S. H.	Duluth
Braverman, N. J.	Duluth
Bray, C. W.	Biwabik
Bullen, F. W.	Hibbing
Burns, R. L.	Two Harbors
Cantwell, W. F.	International Falls
Carstens, C. F.	Hibbing
Chapman, T. L.	Duluth
Cheney, E. L.	Duluth
Christensen, E. P.	Two Harbors
Clark, F. F.	Duluth
Clement, T. G.	Duluth
Collins, A. N.	Duluth
Collins, H. C.	Duluth
Coventry, W. A.	Duluth
Davis, B. F.	Duluth
Doolittle, L. E.	Duluth
Doyle, G. C.	Duluth
Drenning, F. C.	Duluth
Eckman, P. F.	Duluth
Ekblad, J. W.	Duluth
Elias, F. J.	Duluth
Emanuel, K. W.	Duluth
Eppard, R. M.	Cloquet
Ewens, H. B.	Virginia
Fawcett, K. R.	Duluth
Fellows, M. F.	Duluth
Feuling, John	Bovey
Fiala, M. J.	Duluth
Fischer, M. McC.	Duluth
Forbes, R. S.	Duluth
Gillespie, M. G.	Duluth
Gillespie, N. H.	Duluth

Goldish, D. R.	Duluth
Goodman, C. E.	Virginia
Gowan, L. R.	Duluth
Graham, Robert	Duluth
Graves, W. N.	Duluth
Hall, A. E.	Virginia
Haney, C. L.	Duluth
Harris, C. N.	Nashwauk
Hatch, W. E.	Duluth
Hathaway, S. J.	Proctor
Hayes, M. F.	Nashwauk
Hedberg, G. A.	Nopeming
Hejam, W. C.	Cook
Heimark, O. E.	Duluth
Hilding, A. C.	Duluth
Hill, F. E.	Duluth
Hirschboeck, F. J.	Duluth
Hirschfield, M. S.	Duluth
Huseby, H. W.	Floodwood
Jacobson, Clarence	Chisholm
Jensen, T. J.	Duluth
Jolin, F. M.	Coleraine
Keyes, C. R.	Duluth
Kiesling, I. H.	Nashwauk
Klein, A. D., Jr.	Chisholm
Klein, Harry	Duluth
Kliman, F. E.	Duluth
Knapp, F. N.	Duluth
Kohlbray, C. O.	Duluth
Kotchevar, F. R.	Eveleth
Kraft, Peter	Duluth
Krantz, C. I.	Duluth
Kuth, J. R.	Duluth
Laird, A. T.	Nopeming
Lamont, J. G.	Nopeming
Lenont, C. B.	Virginia
Lepak, F. J.	Duluth
Litman, S. N.	Duluth
Loofbourrow, E. H.	Keewatin
Lum, C. E.	Duluth
MacRae, G. C.	Duluth
Magney, F. H.	Duluth
Malmstrom, J. A.	Virginia
Manley, J. R.	Duluth
Martin, E. T.	Duluth
Martin, W. C.	Duluth
Mayne, R. M.	Duluth
McCarty, P. D.	Ely
McComb, C. F.	Duluth
McCoy, Mary K.	Duluth
McDaniel, S. P.	Mountain Iron
McDonald, A. L.	Duluth
McHaffie, O. L.	Duluth
McLeod, J. L.	Grand Rapids
McNutt, J. R.	Duluth
Merriman, L. L.	Duluth
Miners, G. A.	Deer River
Moe, R. J.	Duluth

Moe, Thomas	Moose Lake
Monroe, P. B.	Soudan
More, C. W.	Eveleth
Morsman, L. W.	Hibbing
Morss, C. R.	Zumbrota
Nelson, E. H.	Chisholm
Nelson, R. L.	Duluth
Nicholson, M. A.	Duluth
Nutting, R. E.	Duluth
Olson, A. E.	Duluth
Parker, O. W.	Ely
Pennie, D. F.	Duluth
Peterson, E. N.	Eveleth
Power, J. E.	Duluth
Powers, K. V.	Hibbing
Raadquist, C. S.	Hibbing
Raiter, F. W. S.	Cloquet
Raiter, R. F.	Cloquet
Robinson, J. M.	Duluth
Rood, D. C.	Hibbing
Rowe, O. W.	Duluth
Rudie, P. S.	Duluth
Ryan, W. J.	Duluth
Salter, R. A.	Virginia
Samson, E. R.	Chisholm
Sarff, O. E.	Buhl
Schroder, C. H.	Duluth
Seashore, D. E.	Duluth
Shapiro, E. Z.	Duluth
Shastid, T. H.	Duluth
Shaw, A. W.	Buhl
Sinamark, Andrew	Hibbing
Slyfield, F. F.	Duluth
Smith, C. M.	Duluth
Smith, E. K.	Duluth
Smith, W. R.	Grand Marais
Spicer, F. W.	Duluth
Spurbeck, R. G.	Cloquet
Strathern, M. L.	Gilbert
Strobel, W. G.	Duluth
Sutherland, H. N.	Ely
Swenson, A. O.	Duluth
Taylor, C. W.	Duluth
Tibbetts, M. H.	Duluth
Tilderquist, D. L.	Duluth
Tuohy, E. L.	Duluth
Urberg, S. E.	Duluth
Vercellini, C. E.	Duluth
Walker, A. E.	Duluth
Wallace, M. O.	Duluth
Webber, E. D.	Duluth
West, E. J.	Duluth
Wheeler, D. W.	Duluth
Wilkinson, Stella	Duluth
Winter, J. A.	Duluth
Young, T. O.	Duluth
Young, V. A.	Duluth
Zlatovskii, Michael	Duluth

SCOTT-CARVER COUNTY MEDICAL SOCIETY

Regular meetings, second Tuesday of the month
 Annual meeting, June
 Number of Members: 26

President	
Eklund, E. J.	Norwood
Secretary	
Ormond, D. T.	Waconia
Buck, F. H.	Shakopee
Cervenka, C. F.	New Prague
Eklund, E. J.	Norwood
Emmerson, W. S.	Mayer

Fischer, H. P.	Shakopee
Fischer, P. M.	Shakopee
Halgren, H. A.	Watertown
Hebeisen, M. B.	Chaska
Hospodarsky, L. J.	New Prague
Juergens, H. M.	Belle Plaine
Lightbourn, E. T.	Jordan
Maertz, W. F.	New Prague
Martin, T. P.	Arlington
Nagel, H. D.	Waconia
Novak, E. E.	New Prague

Olson, C. J.	Belle Plaine
Ormond, D. T.	Waconia
Phillips, W. H.	Jordan
Reiter, H. W.	Shakopee
Schimelpfenig, G. T.	Chaska
Schneider, H. A.	Jordan
Simons, B. H.	Chaska
Westerman, A. E.	Montgomery
Westerman, F. C.	Montgomery
Woodworth, L. F.	Le Center
Wunder, H. E.	Shakopee

SOUTHWESTERN MINNESOTA MEDICAL SOCIETY

Cottonwood, Jackson, Murray, Nobles, Pipestone and Rock Counties
 Regular meetings, May
 Annual meeting, October
 Number of Members: 45

President	
DeBoer, Hermanus	Edgerton
Secretary	
McKeown, E. G.	Pipestone
Arnold, E. W.	Adrian
Basinger, H. R.	Mountain Lake
Benjamin, W. G.	Pipestone
Bofenkamp, F. W.	Luverne
Bouquet, B. J.	Adrian

Brown, A. H.	Pipestone
Chadbourne, A. G.	Heron Lake
Cress, P. J.	Ellsworth
DeBoer, Hermanus	Edgerton
Dudley, J. H.	Windom
Engl, Sigfred	Jackson
Halloran, W. H.	Jackson
Halpern, D. J.	Brewster
Johnson, R. E.	Worthington
Johnson, V. E.	Ely
Kilbride, E. A.	Worthington

Larson, J. T.	Lake Wilson
Lowe, Thomas	Pipestone
Maitland, D. P.	Jackson
Manson, F. M.	Worthington
McCrea, J. M.	Fulda
McKeown, E. G.	Pipestone
Mork, B. O., Sr.	Worthington
Mork, B. O., Jr.	Worthington
Nusbaum, D. H.	Jackson
Patterson, W. E.	Westbrook
Pertl, A. L.	Windom

Piper, W. A. Mountain Lake
 Portmann, W. C. Jackson
 Priest, R. E. Worthington
 Rose, J. T. Lakefield
 Schutz, E. S. Mountain Lake
 Sherman, C. L. Luverne

Slater, S. A. Worthington
 Sogge, L. L. Windom
 Sorenson, E. M. Round Lake
 Stanley, C. R. Worthington
 Stratte, H. C. Windom
 Thorson, E. O. Luverne

Tofte, Josephine Dawson
 Waller, J. D. Wilmot
 Williams, A. B. St. Paul
 Williams, C. A. Pipestone
 Williams, L. A. Slayton
 Wright, C. O. Luverne

STEARNS-BENTON COUNTY MEDICAL SOCIETY

Regular meetings, third Thursday of the month
 Annual meeting, third Thursday of December
 Number of Members: 33

President
 Sherwood, G. E. Kimball
 Secretary
 Libert, J. N. St. Cloud
 Beuning, J. B. Albany
 Boardman, D. V. St. Cloud
 DuBois, J. A. Sauk Center
 DuBois, J. F. Sauk Center
 Freeman, W. L. St. Cloud
 Friesleben, William. Sauk Rapids
 Engstrom, G. F. Belgrade

Gelz, J. J. St. Cloud
 Goehrs, H. W. St. Cloud
 Hemstead, Werner St. Cloud
 Johnson, Walfred Sauk Center
 Jones, R. N. St. Cloud
 Kettlewell, R. B. Sauk Center
 Kohler, D. W. St. Joseph
 Koop, S. H. Richmond
 Kuhlmann, August Melrose
 Lewis, C. B. St. Cloud
 Libert, J. N. St. Cloud
 Mahowald, A. Albany
 Mass, Max Cold Spring

McDowell, J. P. St. Cloud
 Moynihan, A. F. Sauk Center
 Rathbun, A. M. Rice
 Rathbun, C. A. St. Cloud
 Ridgway, Alexander South Haven
 Rydberg, W. C. Brooten
 Schatz, F. J. St. Cloud
 Sherwood, G. E. Kimball
 Stangl, Fred St. Cloud
 Stangl, P. E. St. Cloud
 Sutton, C. S. St. Cloud
 Wenner, W. T. St. Cloud
 Zachman, A. H. Melrose

STEELE COUNTY MEDICAL SOCIETY

Regular meetings, second Tuesday of odd months
 Annual meeting, last meeting of the year
 Number of Members: 17

President
 Roberts, W. C. Owatonna
 Secretary
 Dewey, D. H. Owatonna
 Berghs, L. V. Owatonna

Carlson, Verne Blooming Prairie
 Dewey, D. H. Owatonna
 Ertel, E. Q. Ellendale
 Farabaugh, C. L. Owatonna
 Flores, O. T. Dodge Center
 Kreuzer, T. C. Owatonna
 McEnaney, C. T. Owatonna
 McIntyre, J. A. Owatonna

Melby, Benedik Blooming Prairie
 Moorhead, D. E. Owatonna
 Nelson, E. J. Owatonna
 Roberts, O. W. Owatonna
 Schaefer, J. F. Owatonna
 Senn, E. W. Owatonna
 Smersh, J. F. Owatonna
 Stewart, A. B. Owatonna

UPPER MISSISSIPPI MEDICAL SOCIETY

Aitkin, Beltrami, Cass, Crow Wing, Hubbard, Koochiching, Lake of the Woods,
 Morrison, Todd and Wadena Counties
 Regular meetings, Spring, Summer, Fall, Winter
 Annual Meeting, January
 Number of Members: 72

President
 Beise, R. A. Brainerd
 Secretary
 Badeaux, G. I. Brainerd
 Agnew, A. T. International Falls
 Badeaux, G. I. Brainerd
 Beise, R. A. Brainerd
 Borgerson, A. H. Sebeka
 Bosland, H. G. Verndale
 Bowers, J. T. Bemidji
 Brink, A. A. Baudette
 Cook, J. M. Staples
 Corrigan, J. E. Spooner
 Craig, C. C. International Falls
 Davis, L. T. Wadena
 Davis, T. C. Wadena
 Feldman, F. M. Ah-Gwah-Ching
 Frost, H. T. Wadena
 Garlock, A. V. Bemidji
 Garlock, D. H. Bemidji
 Gerber, M. P. Brainerd
 Ghostley, Mary C. Puposky
 Gifford, B. L. Hewitt
 Gilmore, Rowland Bemidji

Grawn, F. A. Northome
 Grogan, J. S. Wadena
 Groschupf, T. P. Bemidji
 Grose, F. N. Clarissa
 Hanover, R. D. Littlefork
 Hanson, E. C. Park Rapids
 Hawkinson, J. P. Crosby
 Hawkinson, L. F. Brainerd
 Healy, R. T. Pierz
 Hendrickson, R. R. Wadena
 Higgs, W. W. Park Rapids
 Holst, C. F. Little Falls
 Holst, J. B. Little Falls
 House, Z. E. Cass Lake
 Houston, C. A. Park Rapids
 Hubbard, O. E. Brainerd
 Hubin, E. G. Deerwood
 Jacobson, D. J. Blackduck
 Jamieson, E. F. Brainerd
 Johnson, E. W. Bemidji
 Kelly, B. W. Aitkin
 Kerlan, S. Z. Aitkin
 Larson, L. M. Oak Terrace
 Laughlin, J. T. Grey Eagle
 Marcum, E. H. Bemidji
 Mark, Hilbert Ah-Gwah-Ching

McHugh, R. F. Aitkin
 Miller, W. A. New York Mills
 Mosby, M. E. Browerville
 Nelson, N. P. Brainerd
 Osburn, B. F. International Falls
 Pierce, C. H. Wadena
 Quanstrom, V. E. Brainerd
 Ringle, O. F. Walker
 Roberts, L. M. Little Falls
 Sach-Rowitz, Alvin Moose Lake
 Shannon, S. S. Crosby
 Simons, E. J. Swanville
 Smith, B. A. Crosby
 Smith, E. H. Bemidji
 Smith, Elton H. Eagle Bend
 Stevens, John Gonvick
 Thabes, J. A., Jr. Brainerd
 Thabes, J. A., Sr. Brainerd
 Thorsness, E. T. Cass Lake
 Thomlinson, H. C. Akeley
 Van Valkenburg, B. F. Long Prairie
 Van Valkenburg, F. W. Long Prairie
 Watson, A. M. Royalton
 Watson, J. D. Holdingford
 Will, W. W. Bertha
 Withrow, M. E. International Falls

WABASHA COUNTY MEDICAL SOCIETY

Regular meetings, one annual meeting
 Annual meeting, first Thursday after first Monday in July
 Number of Members: 9

President
 Radabaugh, R. C. Hastings
 Secretary
 Wilson, W. F. Lake City

Bayley, E. C. Lake City
 Cochrane, W. J. Lake City
 Fleischhauer, D. S. Wabasha
 Frost, R. H. Wabasha
 Ochsner, C. G. Wabasha

Radabaugh, R. C. Hastings
 Slocumb, J. A. Plainview
 Stryker, W. B. Plainview
 Wilson, W. F. Lake City

WASECA COUNTY MEDICAL SOCIETY

Regular meeting, by call of President
 Annual meeting, third Friday in December
 Number of Members: 10

President
 Swenson, O. J. Waseca
 Secretary
 Chadbourn, C. R. Janesville

Bernstein, W. C. New Richland
 Chadbourn, C. R. Janesville
 Gallagher, B. J. Waseca
 Hagen, H. O. New Richland
 Hottinger, R. C. Janesville

Lynn, J. F. Waseca
 McIntire, H. M. Waseca
 Oeljen, S. C. G. Waseca
 Swenson, O. J. Waseca
 Tavenner, J. L. Waseca

WASHINGTON COUNTY MEDICAL SOCIETY

Regular meetings, second Tuesday in January, February, March, April, May, September,

October, November and December

Annual meeting, second Tuesday in December

Number of Members: 15

President
Brooks, G. F. Stillwater

Secretary
Boleyn, E. S. Stillwater
Boleyn, E. S. Stillwater

Brekke, H. J. Stillwater
Brooks, G. F. Stillwater
Ewald, R. P. Newport
Haines, J. H. Stillwater
Hewson, W. J. Stillwater
Humphrey, W. R. Stillwater
Joseski, R. J. Stillwater

Kalinoff, D. Stillwater
Poirer, J. A. Forest Lake
Ruggles, G. McC. Forest Lake
Strand, E. V. Bayport
Stuhr, J. W. Stillwater
Thompson, V. C. Marine-on-St. Croix
Van Meier, Henry Stillwater

WATONWAN COUNTY MEDICAL SOCIETY

Annual meeting, first Thursday in December

Number of Members: 7

President
Hagen, O. E. Butterfield

Secretary
Grimes, H. B. Madelia

Bergman, O. B. St. James
Bratrude, E. J. St. James
Bregel, F. L. St. James
Grimes, H. B. Madelia

Hagen, O. E. Butterfield
McCarthy, W. J. Madelia
Thompson, Albert St. James

WEST CENTRAL MINNESOTA MEDICAL SOCIETY

Big Stone, Pope, Stevens and Traverse Counties

Regular meetings, second Wednesday of January, April and July

Annual meeting, second Wednesday of October

Number of Members: 20

President
Giesen, A. F. Starbuck

Secretary
Nelson, M. C. Lowry

Arneson, A. I. Morris
Bergan, Otto Clinton

Bolsta, Charles Ortonville
Caine, C. E. Morris
Cumming, J. F. Morris
Doleman, N. F. Tintah
Eberlin, E. A. Glenwood
Elsey, E. McC. Glenwood
Elsey, J. R. Glenwood
Ewing, C. F. Wheaton
Fitzgerald, E. T. Morris

Giesen, A. F. Starbuck
Karn, B. R. Ortonville
Leland, J. T. Herman
Lindberg, A. L. Wheaton
McIver, B. A. Lowry
Nelson, M. C. Lowry
Oliver, C. I. Graceville
Oliver, I. L. Graceville
Shelver, H. J. Ortonville

WINONA COUNTY MEDICAL SOCIETY

Regular meetings, first Monday in January, April, July and October

Annual meeting, first Monday in January

Number of Members: 27

President
Benoit, F. T. Winona

Secretary
Steiner, I. W. Winona

Benoit, F. T. Winona
Christensen, E. E. Winona
Clay, F. H. St. Charles
Dierkes, G. J. Rollingstone
Dukelow, D. A. St. Charles

Fetter, Mary St. Paul
Heise, W. F. C. Winona
Keyes, E. D. Winona
Keyes, J. D. Winona
Kroning, C. G. St. Charles
Lichtenstein, H. Winona
Lindsay, W. V. Winona
Mattison, P. A. Winona
McLaughlin, E. M. Winona
Meinert, A. E. Winona
Nauth, W. W. Winona

Neumann, C. A. Winona
Page, R. L. St. Charles
Risser, E. D. Winona
Robbins, C. P. Winona
Satterlee, H. W. Lewiston
Schaefer, S. Winona
Steiner, I. W. Winona
Tweedy, G. J. Winona
Walker, G. H. Winona
Wilson, R. H. Winona
Younger, L. I. Winona

WRIGHT COUNTY MEDICAL SOCIETY

Regular meetings, quarterly

Annual meeting, first Tuesday after first Monday in October

Number of Members: 16

President
Bendix, L. H. Annandale

Secretary
Catlin, J. J. Buffalo

Anderson, W. P. Buffalo
Bendix, L. H. Annandale

Catlin, J. J. Buffalo
Ellison, F. E. Monticello
Grundset, O. J. Montrose
Harriman, L. Howard Lake
Hart, W. E. Monticello
Johnson, V. P. Delano
Klaveness, E. St. Paul

Lee, J. L. Watertown
Peterson, O. L. Cokato
Phillips, A. E. Delano
Ridgway, A. M. Annandale
Roholt, C. L. Waverly
Rousseau, Victor Maple Lake
Walfred, K. A. Cokato

ALPHABETICAL ROSTER

Aanes, A. M.	Red Wing	Barr, W. H.	Wells	Bouman, H. A. H.	Minneapolis
Abbott, J. S.	St. Paul	Barron, Moses	Minneapolis	Bowers, J. T.	Beמיד
Abbott, W. H.	Hawley	Barry, L. W.	St. Paul	Bowing, H. H.	Rochester
Abraham, A. L.	Gibson	Barsness, Nellie	St. Paul	Boyer, S. H.	Duluth
Adams, B. S.	Hibbing	Basinger, H. R.	Mountain Lake	Boynton, Ruth	Minneapolis
Adams, R. C.	Bird Island	Bass, G. W.	Minneapolis	Boysen, Herbert	Welcome
Adams, R. T.	Mantorville	Bayard, H. F.	Minneapolis	Boysen, Peter	Pelican Rapids
Adkins, C. M.	Thief River Falls	Bayley, E. C.	Lake City	Braasch, W. F.	Rochester
Adson, A. W.	Rochester	Beadie, W. D.	Cannon Falls	Bracken, H. M.	Claremont, Calif.
Agnew, A. T.	International Falls	Beals, Hugh	St. Paul	Brand, G. D.	St. Paul
Ahrens, A. E.	St. Paul	Beard, A. H.	Minneapolis	Brand, W. A.	Redwood Falls
Ahrens, A. H.	St. Paul	Beard, R. O.	Minneapolis	Branton, A. F.	Willmar
Aitkens, H. B.	Le Center	Beaver, D. C.	Rochester	Branton, B. J.	Willmar
Akins, W. M.	Eveleth	Beckman, W. G.	Minneapolis	Bratrud, A. F.	Minneapolis
Albers, E. C.	Rochester	Bedford, E. W.	Minneapolis	Bratrud, O. E.	Thief River Falls
Alberts, M. W.	St. Paul	Beede, Ethel R.	Faribault	Bratrude, E. J.	St. James
Alden, J. F.	St. Paul	Behmler, F. W.	Appleton	Braverman, N. J.	Duluth
Alexander, C. E.	Duluth	Beise, R. A.	Brainerd	Bray, C. W.	Biwabik
Alexander, F. H.	St. Paul	Beiswanger, R. H.	Wykoff	Bray, E. R.	St. Paul
Aling, C. P.	Minneapolis	Bell, C. C.	St. Paul	Bregel, F. L.	St. James
Allen, A. W.	Austin	Bell, E. T.	Minneapolis	Brekke, H. J.	Stillwater
Allen, C. C.	Austin	Belote, G. B.	Caledonia	Brey, F. W.	Wabasso
Allen, E. V.	Rochester	Bendix, L. H.	Annandale	Briggs, J. F.	St. Paul
Allen, H. W.	Minneapolis	Benedict, E. E.	Minneapolis	Brigham, Frank	Watkins
Allen, W. A.	Rochester	Benedict, W. L.	Rochester	Brink, A. A.	Baudette
Allison, R. G.	Minneapolis	Benepe, J. L.	St. Paul	Brock, W. G.	Rochester
Altrow, H. O.	Minneapolis	Benham, E. W.	Mankato	Broders, A. C.	Rochester
Alvarez, W. C.	Rochester	Benjamin, A. E.	Minneapolis	Brodie, W. D.	St. Paul
Amberg, Samuel	Rochester	Benjamin, W. G.	Pipestone	Broker, W. S.	Battle Lake
Andersen, A. G.	Minneapolis	Benn, F. G.	Minneapolis	Brooks, G. F.	Stillwater
Andersen, S. C.	Minneapolis	Bennton, P. H.	St. Paul	Brown, A. E.	Rochester
Anderson, C. M.	Rochester	Benoit, F. T.	Winona	Brown, A. H.	Pipestone
Anderson, C. R.	Rochester	Benson, T. Q.	East Grand Forks	Brown, E. D.	Minneapolis
Anderson, D. D.	Minneapolis	Bentley, N. P.	St. Paul	Brown, E. I.	St. Paul
Anderson, E. D.	Minneapolis	Berdez, G. L.	Duluth	Brown, E. J.	Minneapolis
Anderson, E. R.	Minneapolis	Bergan, Otto	Clinton	Brown, G. E.	Rochester
Anderson, F. J.	Minneapolis	Berge, D. O.	Roseau	Brown, J. C.	St. Paul
Anderson, J. K.	Minneapolis	Bergh, L. N.	Montevideo	Brown, L. L.	Crookston
Anderson, K. W.	Minneapolis	Bergheim, M. C.	Hawley	Brown, P. W.	Rochester
Anderson, M. J.	Rochester	Berghs, L. V.	Owatonna	Brown, R. W.	Cambridge
Anderson, N. E.	Harmony	Bergman, O. B.	St. James	Brownstone, Manuel	Sandstone
Anderson, P. A.	Minneapolis	Bergquist, K. E.	Duluth	Brunsting, L. A.	Rochester
Anderson, R. E.	Willmar	Berkman, D. M.	Rochester	Brusegard, J. F.	Red Wing
Anderson, S. H.	Red Wing	Berkman, J. M.	Rochester	Buck, F. H.	Shakopee
Anderson, U. S.	Minneapolis	Berkewitz, N. J.	Minneapolis	Buie, L. A.	Rochester
Anderson, W. P.	Buffalo	Bernard, B. C.	Thief River Falls	Bulkley, Kenneth	Minneapolis
Anderson, W. S.	Minneapolis	Bernstein, W. C.	New Richland	Bullard, Mattie J.	Minneapolis
Andreassen, E. C.	Minneapolis	Berrisford, P. D.	St. Paul	Bullen, F. W.	Hibbing
Andrews, R. N.	Mankato	Bertelson, O. L.	Crookston	Bumpus, H. C.	Rochester
Annis, H. B.	Minneapolis	Bessesen, A. N., Jr.	Minneapolis	Burch, F. E.	St. Paul
Archibald, F. M.	Mahnomen	Bessesen, A. N., Sr.	Minneapolis	Burch, H. A.	Rochester
Arends, A. L.	Askov	Bessesen, D. H.	Minneapolis	Burfiend, G. H.	St. Paul
Arey, H. C.	Excelsior	Bessesen, W. A.	Minneapolis	Burnap, W. L.	Fergus Falls
Arlander, C. E.	Minneapolis	Beuning, J. B.	Albany	Burns, H. D.	Albert Lea
Armstrong, E. L.	Duluth	Bianco, A. J.	Duluth	Burns, M. A.	Milan
Armstrong, J. M.	St. Paul	Bicek, J. F.	St. Paul	Burns, R. L.	Two Harbors
Arneson, A. I.	Morris	Biederman, Jacob	Thief River Falls	Burns, R. M.	St. Paul
Arnold, D. C.	Minneapolis	Bigelow, C. E.	Dodge Center	Burton, C. G.	St. Paul
Arnold, E. W.	Adrian	Billings, R. E.	Franklin	Busher, H. H.	St. Paul
Arnquist, A. S.	St. Paul	Binet, H. E.	Grand Rapids	Butler, John	Minneapolis
Arson, J. M.	Benson	Binger, H. E.	St. Paul	Butsch, W. L.	Rochester
Arvidson, C. G.	Minneapolis	Binger, M. W.	Rochester	Button, A. J.	Pine River
Athens, A. G.	Duluth	Birkland, O. N.	Hibbing	Butturff, C. R.	Freeborn
Atkinson, Walter	Rochester	Birnberg, T. L.	St. Paul	Butz, J. A.	Monterey
Aune, Martin	Minneapolis	Black, William	Mankato	Butzer, J. A.	Mankato
Aurand, W. H.	Minneapolis	Blacklock, S. S.	Hibbing	Buzzelle, L. K.	Minneapolis
Aurelius, J. R.	St. Paul	Blake, Jas.	Hopkins	Byram, J. W.	Echo
Ausman, C. F.	St. Paul	Blake, T. W.	Rochester		
Avery, J. F.	Minneapolis	Blakely, C. C.	Barnum		
Ayres, G. T.	Ely	Blanchard, H. G.	Fairmont		
		Blaustone, H. H.	Minneapolis		
Babcock, F. M.	Northfield	Blegen, H. M.	Warren		
Bachus, A. S.	St. Paul	Blumenthal, J. S.	Columbia Heights		
Bacon, D. K.	St. Paul	Boardman, D. V.	St. Cloud		
*Bacon, Knox	San Diego, Calif.	Bock, R. A.	St. Paul		
Bacon, L. C.	St. Paul	Boeckman, Egil	St. Paul		
Bacon, R. S.	Montevideo	Bofenkamp, F. W.	Luverne		
Badeaux, G. I.	Brainerd	Bohl, G. W.	Ada		
Bagley, Elizabeth C.	Duluth	Bohland, E. H.	St. Paul		
Bagley, W. R.	Duluth	Boies, L. R.	Minneapolis		
Bailey, H. B.	Fairmont	Bolender, H. L.	St. Paul		
Baken, M. P.	Minneapolis	Boley, E. S.	Stillwater		
Baker, A. C.	Fergus Falls	Boline, C. A.	Battle Lake		
Baker, A. T.	Minneapolis	Bolsta, Charles	Ortonville		
Baker, C. P.	Rochester	Boman, P. G.	Duluth		
Baker, E. L.	Minneapolis	Booth, A. E.	Minneapolis		
Baker, H. R.	Hayfield	Boothby, W. M.	Rochester		
Baker, Looe	Minneapolis	Bouquet, B. J.	Adrian		
Baker, N. H.	Fergus Falls	Boquist, H. S.	Minneapolis		
Balfour, D. C.	Rochester	Boreen, C. A.	Minneapolis		
Bannick, E. G.	Rochester	Borg, J. F.	St. Paul		
Barber, J. P.	Minneapolis	Borgerson, A. H.	Sebeka		
Barber, K. W.	Rochester	Borgeson, E. J.	Minneapolis		
Bardon, Richard	Duluth	Bosland, H. G.	Verndale		
Bargen, J. A.	Rochester	Bossert, C. S.	Mora		
Barker, N. W.	Rochester	Bossingham, O. N.	Lake Benton		
Barnes, A. R.	Rochester	Bostrom, A. E.	St. Paul		
Barney, L. A.	Duluth	Bottolfson, B. T.	Moorhead		
		Bouma, L. R.	St. Paul		
				Cable, M. L.	Minneapolis
				Cabot, C. M.	Rochester
				Cabot, G. S.	Minneapolis
				Cabot, Hugh	Rochester
				Cabot, V. S.	Minneapolis
				Cady, L. H.	Minneapolis
				Caine, C. E.	Morris
				Caldwell, J. P.	St. Paul
				Caldwell, K. S.	St. Paul
				Callahan, F. F.	Pokegama
				Cameron, Isabell	Minneapolis
				Camp, J. D.	Rochester
				Camp, W. E.	Minneapolis
				Campbell, J. E.	South St. Paul
				Campbell, L. M.	Minneapolis
				Campbell, O. J.	Minneapolis
				Canfield, W. W.	Houston
				Cantwell, W. F.	International Falls
				Cardle, A. E.	Minneapolis
				Carlaw, C. M.	Minneapolis
				Carlson, A. E.	Warren
				Carlson, C. E.	Stephen
				Carlson, Lawrence	Minneapolis
				Carlson, Verne	Blooming Prairie
				Carman, J. E.	Detroit Lakes
				Caron, R. P.	Minneapolis
				Carroll, W. C.	St. Paul
				Carstens, C. F.	Hibbing
				Carter, F. G.	St. Paul
				Catlin, J. J.	Buffalo
				Cavanor, F. T.	Minneapolis

*Deceased.

*Deceased.

Cervenka, C. F.	New Prague	Davis, Herbert	St. Paul	Engstrand, O. J.	Minneapolis
Chadbourne, A. G.	Heron Lake	Davis, I. G.	Rushford	Engstrom, F. A.	Wanamingo
Chadbourne, C. R.	Janesville	Davis, J. C.	Minneapolis	Engstrom, G. F.	Belgrade
Chambers, W. C.	Blue Earth	Davis, L. T.	Wadena	Eppard, R. M.	Cloquet
Chapman, T. L.	Duluth	Davis, P. L.	Rochester	Erb, F. A.	Minneapolis
Chatterton, C. C.	St. Paul	Davis, T. C.	Wadena	Erdman, C. A.	Minneapolis
Cheney, E. L.	Duluth	Davis, William	St. Paul	Erickson, Eskil	Halstad
Cherry, C. H.	Minneapolis	Deacon, A. E.	Rochester	Erickson, R. F.	Minneapolis
Chesley, A. J.	Minneapolis	De Boer, Hermanus	Edgerton	Ericson, R. M.	Minneapolis
Christensen, E. E.	Winona	Delolph, Karl	St. Paul	Ericson, Swan	Le Sueur
Christensen, E. P.	Two Harbors	Delmore, J. L.	Roseau	Ernest, G. C.	So. St. Paul
Christenson, C. R.	Minneapolis	Demo, P. W.	Wells	Ertel, E. Q.	Ellendale
Christiansen, A.	St. Paul	Denman, A. V.	Mankato	Eshelhy, E. C.	St. Paul
Christianson, H. W.	Minneapolis	Derauf, B. I.	St. Paul	Esser, John	Perham
Christison, J. T.	St. Paul	Desjardins, A. U.	Rochester	Estrem, C. O.	Fergus Falls
Church, G. T.	Rochester	Devereaux, T. J.	Wayzata	Eusterman, G. B.	Rochester
Clark, F. F.	Duluth	Dewey, D. H.	Owatonna	Evans, E. T.	Minneapolis
Clark, H. S.	Minneapolis	Dickson, T. H., Jr.	St. Paul	Evans, R. D.	Minneapolis
Clark, T. C.	Minneapolis	Diehl, H. S.	Minneapolis	Evans, V. L.	Thief River Falls
Clay, F. H.	St. Charles	Dierkes, G. J.	Rollingstone	Evarts, A. B.	Rochester
Claydon, D. R.	Red Wing	Diessner, H. D.	Minneapolis	Ewald, R. P.	Newport
Claydon, L. E.	Red Wing	Dittman, G. C.	St. Paul	Ewens, H. B.	Virginia
Clement, T. G.	Duluth	Dixon, C. F.	Rochester	Ewing, C. F.	Wheaton
Clement, J. B.	Lester Prairie	Dolder, F. C.	Eyota	Exley, E. W. F.	Minneapolis
Clifton, T. A.	Chatfield	Doleman, N. F.	Tintah		
Coate, J. D.	Rochester	Donaldson, C. A.	Mesa, Arizona	Faher, J. E.	Rochester
Cochrane, W. J.	Lake City	Donohue, P. F.	St. Paul	Fahey, E. W.	St. Paul
Cohen, S. S.	Oak Terrace	Doolittle, L. E.	Duluth	Fahr, G. E.	Minneapolis
Colby, Woodard	St. Paul	Dordal, J.	Sacred Heart	Fansler, W. A.	Minneapolis
Cole, H. B.	Redwood Falls	Dorge, R. L.	Minneapolis	Farahaugh, C. L.	Owatonna
Cole, J. G.	Redwood Falls	Dornblaser, H. B.	Minneapolis	Farrish, R. C.	Sherburn
Cole, W. H.	St. Paul	Dorsey, G. C.	Minneapolis	Fasbender, H. A.	Hastings
Coleman, F. B.	Austin	Dorsey, J. M.	Rochester	Fawcett, A. M.	Renville
Collie, H. G.	St. Paul	Dovre, C. M.	St. Paul	Fawcett, C. E.	Stewartville
Collins, A. N.	Duluth	Dowdell, W. J.	Kerkhoven	Fawcett, K. R.	Duluth
Collins, D. C.	Rochester	Doxey, G. L.	Minneapolis	Feeney, J. M.	Minneapolis
Collins, H. C.	Duluth	Doyle, G. C.	Duluth	Feldman, F. M.	Ah-Gwah Ching
Colvin, A. R.	St. Paul	Doyle, L. O.	Minneapolis	Fellows, M. F.	Duluth
Combacker, L. C.	Fergus Falls	Drake, C. B.	St. Paul	Fenger, E. P. K.	Oak Terrace
Comfort, M. W.	Rochester	Drake, C. R.	Minneapolis	Ferguson, J. C.	St. Paul
Condit, W. H.	Minneapolis	Drake, F. A.	Lanesboro	Fesler, H. H.	St. Paul
Conner, H. M.	Rochester	Dredge, H. P.	Sandstone	Fetter, Mary	St. Paul
Connor, C. E.	St. Paul	Drenckhahn, C. H.	Rochester	Fetterly, Warren	Minneapolis
Cook, E. N.	Rochester	Drenning, F. C.	Duluth	Feuling, John	Bovey
Cook, H. W.	Minneapolis	Drill, H. E.	Hopkins	Fiala, M. J.	Duluth
Cook, J. M.	Staples	Drips, D. G.	Rochester	Figi, F. A.	Rochester
Cooney, H. C.	Princeton	Drought, W. W.	Fergus Falls	Fiksdal, M. J.	Willmar
Corbett, J. F.	Minneapolis	Dubhe, F. H.	New Ulm	Fink, L. W.	Minneapolis
Corniea, A. D.	Minneapolis	Du Bois, J. A.	Sauk Center	Fink, W. H.	Minneapolis
Corrigan, J. E.	Spooner	Du Bois, J. F.	Sauk Center	Fischer, H. P.	Shakopee
Cosgriff, J. A.	Bird Island	Dudley, J. H.	Windom	Fischer, M. McC.	Duluth
Cosman, E. O.	Minneapolis	Dugan, L. F.	Fairhale	Fischer, P. M.	Shakopee
Costello, R. T.	Rochester	Dukelow, D. A.	St. Charles	Fitzgerald, D. F.	Minneapolis
Cottam, G. G.	Minneapolis	Dulude, S. S.	Dassel	Fitzgerald, E. T.	Morris
Counsellor, V. S.	Rochester	Dumas, A. G.	Minneapolis	Fjeldstad, C. A.	Minneapolis
Countryman, R. S.	St. Paul	Duncan, Henry	Marietta	Flanagan, H. F.	St. Paul
Covell, W. W.	St. Peter	Duncan, J. W.	Moorhead	Flanagan, L. G.	Austin
Covenry, W. A.	Duluth	Dungan, N. S.	Northfield	Flancher, L. H.	Lake Park
Cowern, E. W.	North St. Paul	Dunlap, E. H.	Minneapolis	Fleischhauer, D. S.	Wabasha
Crafts, L. M.	Minneapolis	Dunlop, J. G., Jr.	Rochester	Flinn, T. E.	Redwood Falls
Cragg, R. W.	Rochester	Dunn, G. R.	Minneapolis	Flom, A. O.	Chisago City
Craig, C. C.	International Falls	Dunn, J. N.	St. Paul	Flores, O. T.	Dodge Center
Craig, W. McK.	Rochester	Durgin, F. L.	Winnebago	Fogarty, C. W.	St. Paul
Cranmer, R. R.	Minneapolis	Duryea, Marhry.	Minneapolis	Fogelberg, E. J.	St. Paul
Cranston, R. W.	St. Louis Park	Duryea, W. M.	Minneapolis	Foley, F. E. B.	St. Paul
Cremer, M. H.	Red Wing	Dutton, C. E.	Minneapolis	Folken, F. G.	Albert Lea
Cremer, P. H.	Hastings	Dvorak, B. A.	Minneapolis	Folta, John	Ceylon
Crenshaw, P. L.	Rochester	Dwan, P. F.	Minneapolis	Forbes, R. S.	Duluth
Cress, E. E.	Boyd	Dworsky, S. D.	Minneapolis	Ford, Burton C.	Marshall
Cress, P. J.	Ellsworth	Dysterheft, A. F.	Gaylord	Ford, W. H.	Minneapolis
Crewe, J. E.	Rochester			Fortney, G. O.	Zumbrota
Critchfield, L. R.	St. Paul	Earl, G. A.	St. Paul	Foshager, Henry T.	Clara City
Cronwell, B. J.	Austin	Earl, R. O.	St. Paul	Foster, R. F.	Rochester
Crow, E. R.	Arlington	Eaton, L. McK.	Rochester	Foster, W. K.	Minneapolis
Crump, J. W.	St. Paul	Eherlin, E. A.	Glenwood	Fowler, L. H.	Minneapolis
Culligan, J. M.	St. Paul	Eckman, P. F.	Duluth	Franchere, F. W.	Lake Crystal
Culver, L. G.	Thief River Falls	Edlund, G.	St. Paul	Francis, D. W.	Fairbault
Cumming, J. F.	Morris	Edward, George	Canton	Frary, Louise G.	Minneapolis
Curtin, J. F.	Minneapolis	Edwards, G. C.	Grove City	Fredericks, G. M.	Minneapolis
Curry, F. S.	Rochester	Edwards, R. T.	Elysian	Frederickson, Alice C.	Lake Lillian
Cutts, George	Minneapolis	Ehmke, W. C.	Willow River	Frederickson, G. U. Y.	Lake Lillian
Cutts, R. E.	Minneapolis	Ehrenberg, C. J.	Minneapolis	Freeman, C. D.	St. Paul
		Ehrlich, S. P.	Minneapolis	Freeman, G. H.	St. Peter
		Eich, Matthew	Minneapolis	Freeman, J. P.	Albert Lea
		Eisenstadt, D. H.	Minneapolis	Freeman, W. L.	St. Cloud
		Eitel, G. D.	Minneapolis	Freigh, W. P.	Albert Lea
		Ekblad, J. W.	Duluth	French, Maude S. S.	Minneapolis
		Eklund, E. J.	Norwood	Fricke, R. E.	Rochester
		Elias, F. J.	Duluth	Friedell, Aaron	Minneapolis
		Ellingson, A. R.	Detroit Lakes	Frieleben, William	Sauk Rapids
		Ellison, D. E.	Minneapolis	Frisch, F. P.	Willmar
		Ellison, F. E.	Monticello	Fritsche, Albert	New Ulm
		Else, E. M.	Glenwood	Fritsche, C. J.	New Ulm
		Else, J. R.	Glenwood	Froats, C. W.	Thief River Falls
		Ely, O. S.	South St. Paul	Froehlich, H. W.	Minneapolis
		Emanuel, K. W.	Duluth	Frost, E. H.	Willmar
		Emerson, E. C.	St. Paul	Frost, H. T.	Wadena
		Emmerson, W. S.	Mayer	Frost, R. H.	Wabasha
		Emmett, J. L.	Rochester	Fugina, G. R.	Mankato
		Endress, E. K.	St. Paul	Funk, V. K.	Oak Terrace
		Engberg, E. J.	St. Paul		
		Engl, Sigfred	Jackson		
				Gaarde, F. W.	Rochester

Gager, E. C.	St. Paul	Hall, A. R.	St. Paul	Henry, C. J.	Milaca
Gaines, E. C.	Buffalo Lake	Hall, H. H.	St. Paul	Henry, M. O.	Minneapolis
Gallagher, B. J.	Waseca	Hall, J. M.	Minneapolis	Hensel, C. N.	St. Paul
Gamble, J. W.	Albert Lea	Hallberg, C. A.	Minneapolis	Henslin, A. E.	Le Roy
Gamble, P. M.	Albert Lea	Hallenbeck, D. F.	Rochester	Herbert, W. L.	Maynard
Gamble, R. M.	Albert Lea	Halloran, W. H.	Jackson	Herbolsheimer, A. J.	Minneapolis
Gammell, J. H.	Minneapolis	Halpern, D. J.	Brewster	Herman, A. L.	Minneapolis
Garbrecht, Arthur.	St. Paul	Halpin, J. E.	Rush City	Hermanson, P. E.	Hendricks
Gardiner, D. G.	St. Paul	Hamel, A. L.	Minneapolis	Herron, R. C.	St. Paul
Gardner, E. L.	Minneapolis	Hamilton, A. S.	Minneapolis	Herrmann, E. T.	St. Paul
Gardner, W. P.	St. Paul	Hamilton, W. S.	Rochester	Hertel, G. E.	Austin
Garlock, A. V.	Bemidji	Hamlin, G. B.	Minneapolis	Hesdorffer, M. B.	Minneapolis
Garlock, D. H.	Bemidji	Hammermeister, T. F.	New Ulm	Hesseltine, V. G.	Taylor's Falls
Garvin, R. O.	Rochester	Hammes, E. M.	St. Paul	Hesselgrave, S. S.	St. Paul
Gates, C. E.	Anoka	Hammond, J. F.	St. Paul	Hewitt, Edith S.	Rochester
Geer, E. K.	St. Paul	Hand, R. O.	Minneapolis	Hewitt, R. M.	Rochester
Gehlen, J. N.	St. Paul	Hand, W. R.	Elbow Lake	Hewson, W. J.	Stillwater
Geist, G. A.	St. Paul	Haney, C. L.	Duluth	Heyerdale, O. C.	Rochester
Gelz, J. J.	St. Cloud	Hankerson, R. G.	Elysian	Heibert, J. P.	Minneapolis
Gerber, M. P.	Brainerd	Hannah, H. B.	Minneapolis	Higgins, J. H.	Minneapolis
Germo, Chas.	Balaton	Hanover, R. D.	Littlefork	Higgs, W. W.	Park Rapids
Ghent, C. H.	St. Paul	Hansen, C. O.	Minneapolis	Hilding, A. C.	Duluth
Ghent, M. M.	St. Paul	Hansen, E. H.	Princeton	Hilger, A. W.	St. Paul
Ghormley, R. K.	Rochester	Hansen, E. W.	Minneapolis	Hilger, D. D.	St. Paul
Ghostley, Mary C.	Puposky	Hansen, Marius.	Ada	Hilger, L. A.	St. Paul
Gianturco, Cesare.	Rochester	Hansen, Olga S.	Minneapolis	Hill, Eleanor J.	Minneapolis
Gibbons, F. C.	Comfrey	Hanson, A. M.	Faribault	Hill, E. M.	Rushford
Gibbs, E. C.	St. Paul	Hanson, E. C.	Park Rapids	Hill, F. E.	Duluth
Gibson, G. G.	Rochester	Hanson, H. J.	Minneapolis	Hines, E. A., Jr.	Rochester
Giere, E. O.	Minneapolis	Hanson, H. V.	Minneapolis	Hinshaw, H. C.	Rochester
Giere, J. C.	Minneapolis	Hanson, W. A.	Minneapolis	Hirschboeck, F. J.	Duluth
Giere, R. W.	Minneapolis	Happe, L. J.	Marshall	Hirschfelder, A. D.	Minneapolis
Giere, S. W.	Benson	Hardwick, R. S.	Rochester	Hirschfield, M. S.	Duluth
Giesen, A. F.	Starbuck	Harmon, G. E.	St. Paul	Hirshfield, F. R.	Minneapolis
Giessler, P. W.	Minneapolis	Harriman, L.	Howard Lake	Hoaglund, A. W.	Minneapolis
Giffin, H. Z.	Rochester	Harrington, C. D.	Minneapolis	Hobbs, C. A.	Minneapolis
Gifford, B. L.	Hewitt	Harrington, F. E.	Minneapolis	Hochfilzer, J. J.	St. Paul
Gilfillan, J. S.	St. Paul	Harrington, S. W.	Rochester	Hodapp, R. J.	Willmar
Gilles, F. L.	Minneapolis	Harris, C. N.	Nashauk	Hodge, S. V.	Minneapolis
Gillespie, M. G.	Duluth	Harrison, P. W.	Worthington	Hodgson, H. H.	Crookston
Gillespie, N. H.	Duluth	Hart, V. L.	Minneapolis	Hoerner, M. T.	Rochester
Gilmore, Rowland.	Bemidji	Hart, W. E.	Monticello	Hoff, Alfred.	St. Paul
Gilpin, S. F., Jr.	Rochester	Hartfel, W. F.	St. Paul	Hoffman, M. H.	St. Paul
Gold, B. A.	Minneapolis	Hartley, E. C.	St. Paul	Hoidale, A. D.	Tracy
Ginsberg, Harry.	Minneapolis	Hartman, H. R.	Rochester	Holbrook, J. S.	Mankato
Ginsberg, William.	St. Paul	Hartzell, T. B.	Minneapolis	Holcomb, J. T.	St. Paul
Goblirsch, A. P.	Sleepy Eye	Haskell, A. D.	Alexandria	Holcomb, O. W.	St. Paul
Goehrs, H. W.	St. Cloud	Hassett, R. G.	Mankato	Holl, P. M.	Minneapolis
Golden, C. M.	Tyler	Hastings, D. R.	Minneapolis	Hollands, W. H.	Fisher
Goldish, D. R.	Duluth	Hatch, W. E.	Duluth	Holm, H. H.	Glencoe
Goldsmith, Grace A.	Rochester	Hathaway, S. J.	Proctor	Holm, P. F.	Wells
Goltz, E. V.	St. Paul	Hauge, M. I.	Clarkfield	Holmberg, L. J.	Canby
Goodman, C. E.	Virginia	Hauge, M. M.	Clarkfield	Holmes, A. E.	Rush City
Goodwin, T. W.	Rochester	Haugen, J. A.	Minneapolis	Holmstrom, C. H.	Warren
Gosslee, G. L.	Moorhead	Haugseth, Enoch.	Twin Valley	Holst, C. F.	Little Falls
Gowan, L. R.	Duluth	Hauser, V. P.	St. Paul	Holst, J. B.	Little Falls
Graham, Robert.	Duluth	Havens, F. Z.	Rochester	Holt, J. E.	St. Paul
Graham, W. D.	Hanska	Havens, J. G. W.	Austin	Holt, W. B.	Minneapolis
Grant, H. W.	St. Paul	Haverfield, Addie R.	Minneapolis	Holtan, Theodore.	Waterville
Gratzek, F. R.	Minneapolis	Hawkins, V. J.	St. Paul	Holte, Halvor.	Crookston
Gratzek, Thomas.	St. Paul	Hawkinson, J. P.	Crosby	Horton, B. T.	Rochester
Grave, Floyd.	Minneapolis	Hawkinson, L. F.	Brainerd	Hospodarsky, L. J.	New Prague
Graves, W. N.	Duluth	Hawkinson, R. P.	Robbinsdale	Hottinger, R. C.	Janesville
Grawn, F. A.	Northome	Hayes, J. M.	Minneapolis	House, Z. E.	Cass Lake
Gray, F. D.	Marshall	Hayes, M. F.	Nashauk	Houston, C. A.	Park Rapids
Gray, H. K.	Rochester	Haynes, A. L.	Faribault	Hovde, Rolf.	Winthrop
Gray, R. C.	Minneapolis	Head, D. P.	Minneapolis	Howard, Laura K.	Fergus Falls
Green, E. K.	Minneapolis	Head, G. D.	Minneapolis	Howard, M. I.	Mankato
Greene, H. H.	Austin	Healy, R. T.	Pierz	Howard, W. H.	Minneapolis
Greene, W. P.	Minneapolis	Hebeisen, M. B.	Chaska	Howard, W. S.	St. Paul
Greisheimer, Esther M.	Minneapolis	Hebert, W. H. J.	Rochester	Howell, L. P.	Rochester
Griffin, A. M.	Rochester	Heck, F. J.	Rochester	Hubbard, O. E.	Brainerd
Griffin, P. J.	Fertile	Heck, W. W.	St. Paul	Hubin, E. G.	Deerwood
Grimes, H. B.	Madelia	Hedback, A. E.	Minneapolis	Huenekens, E. J.	Minneapolis
Grimes, Marian.	Minneapolis	Hedberg, G. A.	Nopeming	Huffington, H. L.	Mankato
Grinnell, W. B.	Preston	Hedding, J. A.	Minneapolis	Hughes, L. D.	Minneapolis
Grise, W. B.	Austin	Hedenstrom, F. G.	St. Paul	Hultkrans, J. C.	St. Paul
Grogan, J. S.	Wadena	Hedenstrom, L. H.	Cambridge	Hultkrans, R. E.	Minneapolis
Gronvall, P. R.	Minneapolis	Hedin, R. F.	Red Wing	Humphrey, E. W.	Moorhead
Groschopf, T. P.	Bemidji	Hegge, O. H.	Austin	Humphrey, W. R.	Stillwater
Grose, F. N.	Clarissa	Hegge, R. S.	Austin	Hunt, R. C.	Fairmont
Gruenhagen, A. P.	St. Paul	Heiam, W. C.	Cook	Hunte, A. F.	Bylas, Arizona
Grundset, O. J.	Montrose	Heiberg, E. A.	Fergus Falls	Hurd, Annah.	Minneapolis
Gullixson, A.	Albert Lea	Heilman, F. R.	Rochester	Husband, M. W.	Minneapolis
Gully, R. J.	St. Peter	Heim, R. R.	Minneapolis	Huseby, H. W.	Floodwood
Gunderson, N. A.	Minneapolis	Heimark, J. J.	Fairmont	Hutchinson, Henry.	New London
Gustafson, H. T.	Minneapolis	Heimark, O. E.	Duluth	Huxley, F. R.	Faribault
		Heise, W. F. C.	Winona	Hyde, T. L.	Rochester
Habein, H. C.	Rochester	Helk, H. H.	Minneapolis	Hynes, Charles.	Minneapolis
Hacking, F. H.	Minneapolis	Helland, G. M.	Spring Grove	Hynes, J. E.	Minneapolis
Haessly, S. B.	Faribault	Helland, J. W.	Spring Grove		
Hagaman, G. K.	St. Paul	Helmholz, H. F.	Rochester	Ide, A. W.	St. Paul
Hagen, G. L.	Minneapolis	Hempstead, B. E.	Rochester	Ikeda, Kano.	St. Paul
Hagen, H. O.	New Richland	Hemstead, Werner.	St. Cloud	Ingebrigtsen, E. K.	Moorhead
Hagen, O. E.	Butterfield	Hench, P. S.	Rochester	Imes, P. R.	Rochester
Hagen, O. J.	Moorhead	Henderson, A. J.	Kiester	Irvine, H. G.	Minneapolis
Haight, G. G.	Audubon	Henderson, M. S.	Rochester	Irwin, A. F.	Minneapolis
Haines, J. H.	Stillwater	Hendrickson, J. F.	Minneapolis		
Haines, S. F.	Rochester	Hendrickson, R. R.	Wadena	Jackson, C. M.	Minneapolis
Hale, D. E.	Rochester	Hengstler, W. H.	St. Paul	Jacobs, A. C.	Elmore
Halgren, H. A.	Watertown	Henney, W. H.	McIntosh	Jacobs, G. C.	Fergus Falls
Hall, A. E.	Virginia	Henry, C. E.	Minneapolis	Jacobs, J. C.	Willmar

Jacquot, G. L.	Marshall	King, Z. P.	St. Paul	Liedloff, A. G.	Mankato
Jacobson, Clarence	Chisholm	Kinsella, T. J.	Oak Terrace	Liffrig, W. W.	Goodhue
Jacobson, D. J.	Blackduck	Kirk, G. P.	East Grand Forks	Lightbourn, E. T.	Jordan
Jamieson, Earl	Walnut Grove	Kirklin, B. R.	Rochester	Lillehei, E. J.	Robbinsdale
Jamieson, E. F.	Brainerd	Kirklin, O. L.	Rochester	Lillie, H. I.	Rochester
Jensen, A. H.	Hutchinson	Kistler, A. J.	Minneapolis	Lima, Ludvig	Montevideo
Jensen, H. H.	Atwater	Kistler, C. M.	Minneapolis	Lind, C. J.	Minneapolis
Jensen, M. J.	Minneapolis	Klaveness, E.	St. Paul	Lindahl, M. J.	Winthrop
Jensen, T. J.	Duluth	Klein, A. D., Jr.	Chisholm	Lindberg, A. L.	Wheaton
Jennings, F. L.	Oak Terrace	Klein, Harry	Duluth	Lindquist, R. H.	Minneapolis
Jennings, Mary H.	Minneapolis	Klein, H. N.	St. Paul	Lindsay, W. V.	Winona
Johnson, A. B.	Minneapolis	Klima, W. W.	Stewart	Linner, H. P.	Minneapolis
Johnson, A. E.	Minneapolis	Kliman, F. E.	Duluth	Linton, W. B.	Minneapolis
Johnson, A. E.	Red Wing	Knapp, F. N.	Duluth	Lippman, H. S.	St. Paul
Johnson, A. M.	St. Paul	Knauff, M. K.	St. Paul	Lippman, E. W.	Hutchinson
Johnson, C. M.	Dawson	Knutson, G. A.	Greenbush	Lipschultz, Oscar	Minneapolis
Johnson, E. W.	Bemidji	Koelsche, G. A.	Minneapolis	Litman, A. B.	Minneapolis
Johnson, Hans	Kerkhoven	Koenigsberger, Charles	Mankato	Litman, S. N.	Duluth
Johnson, H. A.	Minneapolis	Koepcke, G. M.	Minneapolis	Little, W. J.	St. Paul
Johnson, H. M.	Dawson	Kohlbray, C. O.	Duluth	Litzenberg, J. C.	Minneapolis
Johnson, H. P.	Fairmont	Kohler, D. W.	St. Joseph	Lloyd, H. J.	Mankato
Johnson, J. A.	Minneapolis	Kolars, I. J.	Le Center	Lochead, D. C.	Rochester
Johnson, J. A.	St. Paul	Koller, H. M.	Minneapolis	Locken, O. E.	Crookston
Johnson, Julius	Minneapolis	Koller, L. R.	Minneapolis	Loenholdt, E. H.	Hector
Johnson, N. A.	Minneapolis	Kolset, C. D.	Sanborn	Logan, A. H.	Rochester
Johnson, Norman	Minneapolis	Kotchevar, F. R.	Eveleth	Logan, F. W.	Blue Earth
Johnson, O. H.	Redwood Falls	Koop, S. H.	Richmond	Loggefeil, R. C.	Minneapolis
Johnson, O. V.	Fergus Falls	Kraft, Peter	Duluth	Lommen, P. A.	Austin
Johnson, R. A.	Minneapolis	Krantz, C. I.	Duluth	Long, Jesse	Minneapolis
Johnson, R. B.	Lanesboro	Kreuzer, T. C.	Owatonna	Loofbourrow, E. H.	Keewatin
Johnson, R. G.	St. Paul	Kroeze, R. G.	Rochester	Loomis, E. A.	Minneapolis
Johnson, R. E.	Worthington	Kroning, C. G.	St. Charles	Love, F. A.	Carlos
Johnson, S. M.	Minneapolis	Kucera, F. J.	Hopkins	Love, J. G.	Rochester
Johnson, T. H.	San Francisco, Calif.	Kucera, S. T.	Lonsdale	Lowe, E. R.	South St. Paul
Johnson, V. E.	Ely	Kucera, W. J.	Minneapolis	Lowe, T. A.	South St. Paul
Johnson, V. P.	Delano	Kuhlmann, August	Melrose	Lowe, Thomas	Pipestone
Johnson, Walfred	Sauk Center	Kuske, A. W.	Faribault	Luden, Georgine	Victoria, B. C., Can.
Johnson, W. E.	Morgan	Kuske, A. L.	New Ulm	Luedtke, G. H.	Fairmont
Johnson, Y. T.	Minneapolis	Kuth, J. R.	Duluth	Luffkin, C. D.	Northfield
Jolin, F. M.	Coleaine	Kvitrud, Gilbert	St. Paul	Lum, C. E.	Duluth
Jolin, R. V.	Lake Park	Laird, A. T.	Nopeming	Lundblad, R. A.	Minneapolis
Jones, A. W.	Red Wing	Lajoie, J. M.	Minneapolis	Lundholm, A. M.	St. Paul
Jones, D. C.	St. Paul	Lamont, J. G.	Nopeming	Lundy, J. S.	Rochester
Jones, E. M.	St. Paul	Lane, Laura A.	Northfield	Lynch, M. J.	Minneapolis
Jones, G. M.	Minneapolis	Langenderfer, F. V.	St. Paul	Lynde, O. G.	Thief River Falls
Jones, H. W.	Minneapolis	Langhoff, A. H.	Glencoe	Lynn, J. F.	Waseca
Jones, R. N.	St. Cloud	Lannin, J. C.	Mabel	Lyon, E. P.	Minneapolis
Jones, W. R.	Minneapolis	Lapierre, A. P.	Minneapolis	Lysne, Henry	Minneapolis
Jordan, L. S.	Granite Falls	Lapierre, C. A.	Minneapolis		
Josewski, R. J.	Stillwater	Lapierre, J. T.	Minneapolis	Macheth, J. L.	St. Clair
Joyce, G. L.	Stewartville	Larsen, C. L.	St. Paul	MacDonald, A. E.	Minneapolis
Joyce, G. T.	Rochester	Larsen, F. W.	Minneapolis	MacDonald, D. A.	Minneapolis
Judd, E. S.	Rochester	Larsen, O. O.	Detroit Lakes	MacDonald, I. C.	Minneapolis
Judd, W. H.	Rochester	Larsen, A. L.	Detroit Lakes	Mach, F. B.	Minneapolis
Juergens, H. M.	Belle Plaine	Larson, C. M.	Minneapolis	Mack, J. J.	Fordey, Ark.
Juers, E. H.	Red Wing	Larson, J. T.	Lake Wilson	Macklin, W. E., Jr.	Litchfield
		Larson, L. M.	Minneapolis	Macnie, J. S.	Minneapolis
Kaasa, L. J.	Albert Lea	Larson, L. M.	Oak Terrace	MacRae, G. C.	Duluth
Kadesky, David	St. Paul	Larson, P. N.	Rochester	Madden, J. F.	St. Paul
Kahala, Arthur	Crookston	Laughlin, J. T.	Grey Eagle	Madland, R. S.	Fairfax
Kalin, O. T.	Minneapolis	Laurent, A. A.	Minneapolis	Maertz, W. F.	New Prague
Kalinooff, D.	Stillwater	LaVake, R. T.	Minneapolis	Magath, T. B.	Rochester
Kamman, G. R.	St. Paul	Lax, M. H.	St. Paul	Magee, H. R.	Rochester
Kamp, B. A.	Albert Lea	Lazar, H. L.	Minneapolis	Maziera, Estelle A.	Rochester
Kannary, E. L.	St. Paul	Leahy, Bartholomew	St. Paul	Magney, F. H.	Duluth
Kanne, C. W.	Faribault	Leavenworth, R. O.	St. Paul	Mahowald, A.	Albany
Karn, B. R.	Ortonville	Leavitt, H. H.	Minneapolis	Maisel, J. J.	Rochester
Kasper, E. M.	St. Paul	Lechowske, J. A.	Minneapolis	Maitland, D. P.	Jackson
Kaufman, W. C.	Appleton	Leck, Paul C.	Austin	Maland, C. O.	Minneapolis
Keith, N. M.	Rochester	Leddy, E. T.	Rochester	Malerich, J. A.	Caledonia
Kelby, G. M.	Minneapolis	Lee, J. L.	Watertown	Malmstrom, J. A.	Virginia
Kelly, B. W.	Aitkin	Lee, W. A.	Fergus Falls	Manley, J. R.	Duluth
Kelly, J. V.	St. Paul	Lee, W. N.	Madison	Manley, L. V.	Albert Lea
Kelly, P. H.	St. Paul	Leibold, H. H.	Parkers Prairie	Mann, A. T.	Minneapolis
Kelsey, C. G.	Hinckley	Leitch, Archibald	St. Paul	Mann, F. C.	Rochester
Kemp, M. W.	Fergus Falls	Leitch, N. M.	Warroad	Manson, F. M.	Worthington
Keneffick, E. V.	St. Paul	Leland, H. R.	Minneapolis	Marble, W. P.	Rochester
Kennedy, C. C.	Minneapolis	Leland, J. T.	Herman	Marley, W. J.	Minneapolis
Kennedy, Jane F.	Minneapolis	Leland, M. N.	Minneapolis	Marcum, E. H.	Bemidji
Kennedy, R. L. J.	Rochester	Lemon, W. S.	Rochester	Mariette, E. S.	Oak Terrace
Kennedy, R. R.	Minneapolis	Lenander, M. E.	St. Peter	Mark, D. B.	Minneapolis
Kennedy, W. A.	St. Paul	Lende, Norman	Faribault	Mark, Hilbert	Ah-Gwah-Ching
Kepler, E. J.	Rochester	Lendrum, F. C.	Rochester	Martin, E. T.	Duluth
Kernohan, J. W.	Rochester	Leonard, G. J.	St. Paul	Martin, T. P.	Arlington
Kerschbaumer, Louisa	St. Peter	Leonard, L. J.	Minneapolis	Martin, W. C.	Duluth
Kertesz, G.	Minneapolis	Leopard, B. A.	Albert Lea	Martineau, J. L.	St. Paul
Kesting, Herman	St. Paul	Lepak, F. J.	Duluth	Mason, P. B.	Rochester
Kettlewell, R. B.	Sauk Center	Lepak, J. A.	St. Paul	Mass, Max	Cold Spring
Kerlan, S. Z.	Aitkin	Lerche, William	Cable, Wisconsin	Massey, B. D.	Rochester
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Keyes, E. D.	Winona	Leven, N. L.	St. Paul	Masson, J. C.	Rochester
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Keyes, J. D.	Winona	Levine, N. M.	Minneapolis	Matthews, Justus	Minneapolis
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Kiesling, I. H.	Nashauk	Lewis, W. W.	St. Cloud	Mattson, C. H.	St. Paul
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King, G. L.	St. Paul			Mayne, R. M.	Duluth
King, H. T.	Minneapolis			Mayo, C. H.	Rochester

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Mayo, W. J.	Rochester	Mork, B. O., Jr.	Worthington	Ormond, D. T.	Waconia
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McCarthy, Donald.	Minneapolis	Morrow, J. J.	Austin	Ouellette, A. J.	St. Paul
McCarthy, J. J.	St. Paul	Morse, R. W.	Minneapolis	Overend, K. V.	Hallock
McCarthy, W. J.	Madelia	Morsman, L. W.	Hibbing	Overton, L. M.	Rochester
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McCarty, W. C.	Rochester	Mosby, M. E.	Browerville	Page, R. L.	St. Charles
McClanahan, J. H.	White Bear	Moses, Joseph, Jr.	Northfield	Palmer, C. F.	Albert Lea
McClanahan, T. S.	White Bear	Moss, M. N.	St. Paul	Palmer, W. L.	Albert Lea
McCloud, C. N.	St. Paul	Moynihan, A. F.	Sauk Center	Paradis, W. G.	Crookston
McComb, C. F.	Duluth	Moynihan, T. J.	St. Paul	Parker, H. L.	Rochester
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McDonald, A. L.	Duluth	Mussey, R. D.	Rochester	Parsons, J. G.	Crookston
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McFarland, A. H.	Minneapolis	Naegeli, Frank	Fergus Falls	Paulsen, E. L.	Minneapolis
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Morehead, D. E.	Owatonna			Raaf, J. E.	Rochester

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 Raiter, R. F. Cloquet
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 Randall, L. M. Rochester
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 Rathbun, C. A. St. Cloud
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 Reed, C. A. Minneapolis
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 Regnier, E. A. Minneapolis
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 Reiter, H. W. Shakopee
 Rempel, D. D. Brownton
 Reynolds, J. S. Minneapolis
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 Richardson, F. S. Minneapolis
 Richardson, H. E. St. Paul
 Richardson, W. J. Fairmont
 Richdort, L. F. Minneapolis
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 Ridgway, A. M. Annandale
 Rigler, L. G. Minneapolis
 Ringle, O. F. Walker
 Rishmiller, J. H. Minneapolis
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 Rivers, A. B. Rochester
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 Roberts, L. M. Little Falls
 Roberts, O. W. Owatonna
 Roberts, T. S. Minneapolis
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 Rohertson, P. A. Austin
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 Robins, C. R., Jr. Rochester
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 Robinson, L. W. Rochester
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 Rogers, F. D. St. Paul
 Rogers, S. F. St. Paul
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 Rohrer, C. A. Waterville
 Rood, D. C. Hibbing
 Rose, J. T. Lakeland
 Rosen, Samuel Minneapolis
 Rosenherger, H. P. St. Paul
 Rosenholtz, Burton St. Paul
 Rosenow, E. C. Rochester
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 Ros-nwald, R. M. Minneapolis
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 Rothrock, J. L. St. Paul
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 Rousseau, Victor Maple Lake
 Roust, H. A. Montevideo
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 Roy, Philemon St. Paul
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 Rudie, P. S. Duluth
 Ruggles, G. McC. Forest Lake
 Rubberg, G. N. St. Paul
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 Rumpf, W. H. Faribault
 Rupp, Alice Minneapolis
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 Russett, A. N. Minneapolis
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 Ryan, M. E. St. Paul
 Ryan, W. J. Duluth
 Rydberg, W. C. Brooten
 Rynearson, E. H. Rochester

Samuelson, Samuel Minneapolis
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 Sanford, A. H. Rochester
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 Satersmoen, Theo. Pelican Rapids
 Sather, E. R. Alexandria
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 Satterlund, V. L. St. Paul
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 Schaefer, S. Winona
 Schaefer, W. G. Minneapolis
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 Scheldrup, N. H. Minneapolis
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 Schimelpfenig, G. T. Chaska
 Schlesselman, George Anoka
 Schlesselman, J. T. Mankato
 Schmidt, P. A. Good Thunder
 Schmidt, W. R. Glencoe
 Schmitt, A. F. Minneapolis
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 Schneider, J. P. Minneapolis
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 Schoch, R. B. St. Paul
 Scholpp, O. W. Hutchinson
 Schons, Edward St. Paul
 Schoofs, G. E. North Branch
 Schottler, G. J. Dexter
 Schroder, C. H. Duluth
 Schuldt, F. C. St. Paul
 Schultz, J. A. Albert Lea
 Schultz, P. J. Minneapolis
 Schulze, A. G. St. Paul
 Schussler, O. F. Minneapolis
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 Schwartz, V. J. Minneapolis
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 Schwyzer, Arnold St. Paul
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 Seham, Max Minneapolis
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 Seifert, O. J. New Ulm
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 Setzer, H. J. St. Paul
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 Shannon, W. R. St. Paul
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 Shapiro, M. J. Minneapolis
 Shastid, T. H. Duluth
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 Sheppard, P. E. Hutchinson
 Sherman, C. L. Luverne
 Sherman, H. T. Bellingham
 Sherwood, G. E. Kimball
 Shillington, M. A. St. Paul
 Short, Jacob St. Paul
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 Simons, B. H. Chaska
 Simons, E. J. Swanville
 Simons, Jalmar Minneapolis
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 Slocumb, J. A. Plainview
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 Smith, B. A. Crosby
 Smith, B. F. Willmar
 Smith, C. M. Duluth

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 Smith, F. L. Rochester
 Smith, H. L. Rochester
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 Smith, M. W. Red Wing
 Smith, N. D. Rochester
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 Smith, W. R. Grand Marais
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 Stafne, W. A. Rochester
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 Staagl, P. E. St. Cloud
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 Stark, W. B. Rochester
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 Sullivan, R. R. Rochester
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 Sutton, L. F. Mazeppa
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 Swanson, J. A. St. Paul
 Swanson, R. E. Minneapolis
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 Sweetser, T. H. Minneapolis
 Sweetser, S. E. Minneapolis
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 Swendsen, J. I. St. Paul
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 Swenson, Charles Braham
 Swenson, O. J. Waseca
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Thabes, J. A., Sr.	Brainerd	Waldron, G. W.	Rochester	Williams, L. A.	Slayton
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Thomas, G. J.	Minneapolis	Wall, C. R.	Minneapolis	Williamson, G. A.	St. Paul
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Thompson, F. A.	St. Paul	Walters, Waltman	Rochester	Wilson, J. A.	St. Paul
Thompson, G. J.	Rochester	Wangenstein, O. H.	Minneapolis	Wilson, J. V.	St. Paul
Thompson, V. C.	Marine-on-St. Croix	Wanous, E. Z.	Minneapolis	Wilson, L. B.	Rochester
Thomson, J. M.	Brownsdale	Ward, A. W.	Minneapolis	Wilson, R. H.	Winona
Thordarson, Theodore	Minneota	Ward, C. E.	Rochester	Wilson, Warren	Northfield
Thornby, H. J.	Moorhead	Ward, P. A.	Minneapolis	Wilson, W. E.	Northfield
Thorsness, E. T.	Cass Lake	Warham, T. T.	Minneapolis	Wilson, W. F.	Lake City
Thorson, E. O.	Luverne	Warneck, R. W.	St. Paul	Wiltrout, I. G.	Oslo
Thorson, O. P.	Northfield	Warren, E. L.	St. Paul	Windsor, R. L.	Rothsay
Thyssel, F. A.	Moorhead	Warren, F. S.	Washington, D. C.	Winnick, J. B.	St. Paul
Tibbetts, M. H.	Duluth	Watkins, C. H.	Rochester	Winter, J. A.	Duluth
Tift, C. R.	St. Paul	Watson, A. M.	Royalton	Winther, Nora M. C.	Minneapolis
Tilderquist, D. L.	Duluth	Watson, J. A.	Minneapolis	Witham, C. A.	Minneapolis
Tingdale, A. C.	Minneapolis	Watson, J. D.	Holdingford	Withrow, M. E.	International Falls
Tofte, Josephine	Dawson	Watson, J. R.	Rochester	Wittich, F. W.	Minneapolis
Tomlinson, H. C.	Akeley	Watson, N. M.	Red Lake Falls	Wohlrahe, A. A.	Minneapolis
Torgerson, W. B.	Oklee	Watz, C. E.	St. Paul	Wohlrahe, C. F.	Minneapolis
Tovell, R. M.	Rochester	Waugh, J. M.	Rochester	Wohlrahe, E. J.	Springfield
Traeger, C. A.	Faribault	Weaver, M. M.	Northfield	Wold, K. C.	St. Paul
Tregilgas, H. R.	So. St. Paul	Webb, R. C.	Minneapolis	Wolfe, H. H.	St. Paul
Trenouth, S. M.	Rochester	Webber, E. E.	Duluth	Wolff, H. J.	St. Paul
Trombley, R. A.	Emmons	Webber, F. L.	St. Paul	Wolner, O. H.	St. Peter
Troost, H. B.	Mankato	Weber, H. M.	Rochester	Woltman, H. W.	Rochester
Truog, C. P.	Lindstrom	Weed, V. A.	Red Lake Falls	Wood, D. F.	Minneapolis
Trutna, T. J.	Silver Lake	Weir, J. F.	Rochester	Wood, G. T., Jr.	Rochester
Tunstead, H. J.	Minneapolis	Weiser, G. B.	New Ulm	Wood, H. G.	Rochester
Tuohy, E. B.	Rochester	Weisman, S. A.	Minneapolis	Woodruff, C. W.	Chatfield
Tuohy, E. L.	Duluth	Welch, M. C.	St. Paul	Woodworth, Elizabeth	Minneapolis
Turnacliiff, D. D.	Minneapolis	Wellbrock, W. L. A.	Rochester	Woodworth, L. F.	Le Center
Turnbull, Robert	Fosston	Wellcome, J. W. B.	Sleepy Eye	Workman, H. M.	Tracy
Tweedy, G. J.	Winona	Welsh, A. L.	Rochester	Workman, W. G.	Tracy
Tyrrell, C. J.	Minneapolis	Wenner, W. T.	St. Cloud	Wray, W. E.	Campbell
		Wentworth, A. J.	Mankato	Wright, C. B.	Minneapolis
Ude, W. H.	Minneapolis	Werner, O. S.	Cambridge	Wright, C. D.	Minneapolis
Ulrich, H. L.	Minneapolis	Wesson, H. R.	Rochester	Wright, C. O.	Luverne
Undine, C. A.	Minneapolis	West, E. J.	Duluth	Wright, F. R.	Minneapolis
Urborg, S. E.	Duluth	Westby, Magnus	Madison	Wunder, H. E.	Shakopee
Urner, J. A.	Minneapolis	Westby, Nels	Madison	Wynne, H. M. N.	Minneapolis
		Westerman, A. E.	Montgomery		
Vaaler, T.	Cannon Falls	Westerman, F. C.	Montgomery	Yaeger, W. W.	Ivanhoe
Vadheim, A. L.	Tyler	Westman, R. T.	Minneapolis	Ylvisaker, R. S.	Minneapolis
Vail, J. B.	Henning	Wethall, A. G.	Minneapolis	Yoerg, O. W.	Minneapolis
Valentine, W. H.	Tracy	Wetherby, Macnider	Minneapolis	Young, T. O.	Duluth
Van Meier, Henry	Stillwater	Weum, T. W.	Minneapolis	Young, V. A.	Duluth
Van Slyke, C. A.	St. Paul	Wheeler, D. W.	Duluth	Younger, L. I.	Winona
Van Valkenburg, B. F.	Long Prairie	Wheeler, M. W.	St. Paul	Youngerman, W. M.	Rochester
Van Valkenburg, F. W.	Long Prairie	Wherry, F. P., Jr.	Rochester	Youngren, E. R.	St. Paul
Vaughan, V. M.	Truman	Whitacre, J. C.	St. Paul		
Veirs, Dean	St. Paul	White, S. M.	Minneapolis	Zachman, A. H.	Melrose
Veirs, Ruby S.	St. Paul	White, W. D.	Minneapolis	Zander, C. H.	St. Paul
Vercellini, C. E.	Duluth	Whitmore, Frank	St. Paul	Zaworski, E. A.	Minneapolis
Vezina, J. C.	Mapleton	Whitson, S. A.	Alden	Zeien, Thomas	North Branch
Vik, A. E.	Minneapolis	Widen, W. F.	Minneapolis	Zellhoefer, H. W. K.	Rochester
Vik, Melvin	Onamia	Wiese, H. F. B.	Minneapolis	Zemke, E. E.	Fairmont
Vinson, P. P.	Rochester	Wilbur, D. L.	Rochester	Zierold, A. A.	Minneapolis
Vogel, H. A. L.	New Ulm	Wilcox, A. E.	Minneapolis	Zimmermann, H. B.	St. Paul
Vogel, J. H.	New Ulm	Wilder, R. L.	Minneapolis	Ziskin, Thomas	Minneapolis
Voldeng, K. E.	Rochester	Wilder, R. M.	Rochester	Zlatovski, Michael	Duluth
Von der Weyer, William	St. Paul	Wilken, P. A.	Minneapolis		

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HEMOCHROMATOSIS: ITS RELATION TO THE METABOLISM OF IRON AND COPPER*

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IN almost all attempts to explain the pathogenesis of hemochromatosis, little if any account is taken of the extreme rarity of the disease in the face of the relatively common occurrence of each of its component elements: cirrhosis of the liver, deposition of iron pigment, and diabetes mellitus. None of these ordinarily progresses into the full-blown picture of bronze diabetes. Hepatic cirrhosis, occurring under a variety of conditions indistinguishable from hemochromatosis, although it may be accompanied by fibrotic changes in the pancreas, spares the islets of Langerhans in most instances and may exist for many years without any disturbance of iron or pigment metabolism⁵³ (Figs. 1 and 2). Again, the siderosis of the hemolytic types of anemia, or that experimentally produced by repeated intravenous injections of hemoglobin, may lead to deposition of sufficient iron pigment in the hepatic cells to cause atrophy of the surrounding cells, without producing the fibrosis that is so characteristic of even early hemochromatosis.⁵⁵ These facts urge one to believe that hemochromatosis is a distinct clinical and pathologic entity, the underlying mechanisms in its production differing essentially from those which cause diabetes mellitus, deposition of iron pigment and hepatic cirrhosis when they occur as separate diseases.

A multiplicity of hypotheses has been advanced as to the etiology of hemochromatosis. The older views are well summarized by Rolleston and Mc-

Nee. The outstanding feature of the disease is the excess, often enormous amounts of iron-containing pigment in the various organs, from which not even the brain is exempt.⁵⁸ The liver alone may contain 33.92 gm. (more than a hundred times the normal amount),¹⁸ whereas chemical analyses by several workers,^{1, 6, 12} have indicated accumulation in the pancreas, lymph nodes, suprarenal glands, skin, and elsewhere. The origin of the pigment has been the subject of extensive investigation and much controversy. Absence of the usual signs of excessive hemolysis in the blood and in the bone marrow precludes the view that hemolysis explains the deposits of iron.

Theories of Increased Retention of Iron

That hemochromatosis may be due to perverted iron metabolism was first suggested by Meltzer in 1900. Not until 1913 was the question further investigated by Garrod and his coworkers,¹³ who concluded that all iron ingested in the food was retained in the body, since they failed to demonstrate the presence of any iron in 5 gm. of dried feces from a patient with hemochromatosis.

The more accurate studies of iron balance made by Howard and Stevens, and McClure, seemed to lend support to this view of retention of food-iron, but a more critical survey of their results, and a consideration of what occurs in normal controls, cast doubts on this seemingly plausible explanation. Reference will be made to this at a later stage.

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This excess of iron in the body suggests either increased absorption or decreased elimination. Both processes may participate in a general metabolic disturbance.

Increased absorption.—The recent studies which have been made on the influence of copper as an adjunct to iron therapy in certain forms of anemia^{9, 17, 22, 24, 28} raises the question as to whether the enhanced beneficial effects are attributable to increased absorption or increased utilization of iron. That copper does not influence the total amount of iron retained in experimental animals has clearly been shown by Josephs.²³ It appears that although copper is not a molecular constituent of hemoglobin, it is a necessary catalyzer in formation of hemoglobin, in much the same way as iron functions in the production of chlorophyll. There is no reason to believe that copper may be a factor in determining the accumulation of iron in hemochromatosis by increasing absorption.

Decreased elimination.—Where iron accumulates in the body to the same extent as in hemochromatosis, under conditions such as are met in pernicious anemia and the types of hemolytic anemia in general, the pathologic states seem to be entirely different. In cases of pernicious anemia, thus, iron is eliminated in large amounts during remissions of the disease.⁵⁰ The avenues by which this excretion of iron is effected have not been finally determined; presumably the large intestine excretes a part,⁷ and it has been shown that the bile contains appreciable amounts of iron at all times.⁵ Direct information is not available as to what part of the increase of iron put out in these cases of controlled Addison's anemia can be attributed to the liver.

There is evidence that during the remissions of pernicious anemia (besides mobilization of the deposited iron pigment) the liver is better able to excrete bilirubin,^{16, 20} a function which we know falls within its physiologic activities. Does it follow, as Rous and Oliver⁵⁵ have suggested, that the cirrhotic liver of hemochromatosis fails to deal adequately with the iron-containing product resulting from normal destruction of blood, and that this leads to passive accumulation in the organism? What follows, however, seems to argue against such an assumption.

The distribution of iron differs significantly in various abnormal states, a fact which is again stressed in support of the suggestion made at the

outset, that the underlying mechanism of hemosiderosis in hemochromatosis differs essentially from that in the conditions under consideration. In experimental animals, in which hemosiderosis can be produced by repeated transfusions of blood, there is an accumulation of iron pigment in the spleen and in the bone marrow to the limit of their capacity of storage. After this only does the liver begin to be pigmented, a condition quite the reverse in hemochromatosis, in which, moreover, the source of iron is in all probability not directly hematogenic.

If the accumulation of iron pigment depends on faulty excretion, then the explanations offered so far are somewhat inadequate. Whipple⁶¹ has agreed with the view that elimination is faulty, but not as a result of disease in the liver. He has regarded disposal of pigment (as well as production of pigment) as dependent on a dynamic protoplasmic function, the derangement of which may lead to a heaping up of pigment (present in traces under normal conditions), in amounts which are to the detriment of, and which finally bring about, destruction of the cells harboring them. Such a disturbance of the whole intracellular metabolism of pigment would adequately explain a morbid process such as hemochromatosis. The manner in which such a disturbance may be brought about is to be considered later.

Theory of Intoxication by Copper

During the past decade, the possibility that hemochromatosis is a manifestation of chronic intoxication from copper has been studied by numerous workers,^{2, 11, 14, 15, 27, 31-35, 40, 48, 56, 60} but no uniformity has arisen out of their results. The facts have been so well reviewed by Lindow, Peterson and Steenbock²⁹ as well as by Flinn and Inouye,¹⁰ that the reader is referred to their respective papers.

The part played by copper in formation of hemoglobin has shed light on a new angle of the subject, and has renewed a controversy concerning the toxic effects of the metal; out of this controversy a voluminous literature revealing important data of both clinical and pathologic interest has arisen.

Copper occurs throughout the plant and animal kingdoms, not as an adventitious contaminant, but, as recent work has shown, serving important functions. Minute doses of copper will de-

stroy organisms, but protein, to which the metal has close affinity, will inhibit this, so that while copper may be regarded as a protoplasmic poison in the general sense of the term, its toxicity is

injury and the subsequent cirrhosis would seem to depend more on the individual susceptibility than on the amount of copper present in the liver. Viewed from this standpoint, and consid-

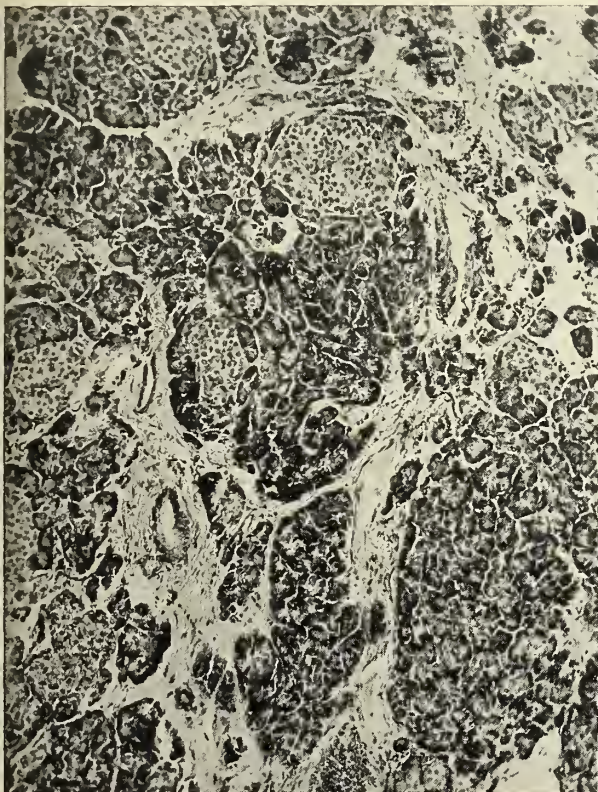


Fig. 1. Section of pancreas from a patient with biliary cirrhosis who had terminal jaundice and ascites. There is marked fibrosis. The islets of Langerhans are well preserved.

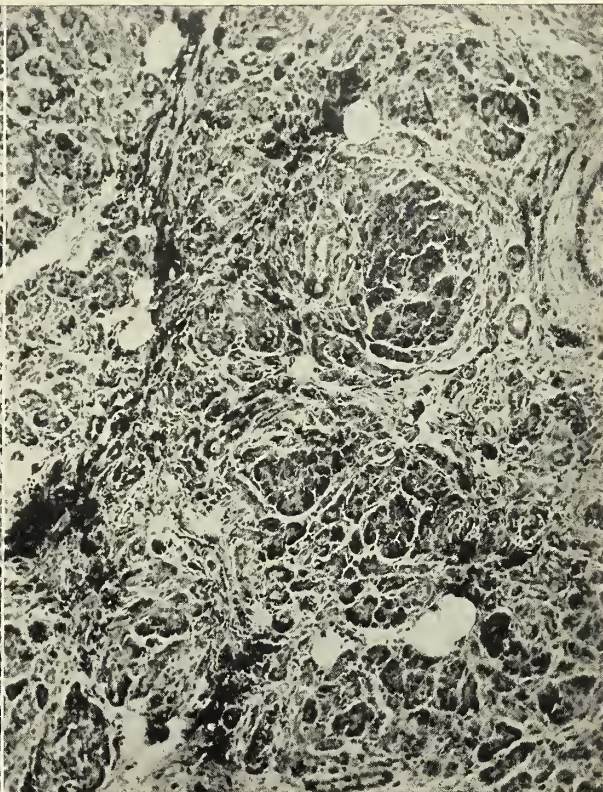


Fig. 2. Section of pancreas from a patient with hemochromatosis. There is marked fibrosis from deposition of iron pigment. The islets of Langerhans are absent.

reduced by combination with the proteins of the food and the mucin of the gastro-intestinal canal. But from the facts which follow, it is evident that the metal is absorbed by the organisms from the bowel (and probably through the mucosa of the respiratory apparatus) and feeding of copper to animals leads to marked increase in the absolute content of copper,¹⁰ especially in the liver, which becomes its chief depository. Although this observation had already been made in 1914 by Corper, who set out ostensibly to test the therapeutic value of copper against the development of experimental tuberculosis, it seems to have escaped the notice of many observers who have drawn conclusions as to the toxicity of the metal on the basis of the copper content of livers in the presence of various diseases. That its toxicity may adversely affect the liver under certain conditions is possible, in which case the hepatic

er the fluctuations in the amounts of exogenous copper which may enter the organism at various times, it hardly seems unusual that the analysis of livers for copper by different workers should yield widely divergent results in the same pathologic condition.^{12, 19}

The effects of large doses of copper over long periods of time need not be discussed here, but the bulk of the evidence points to the fact that the body can handle large doses of copper without demonstrable deleterious effects in most instances.

Furthermore, it is hard to reconcile the fact that copper is essentially a protoplasmic poison with the findings that the liver⁴² of the newly-born animal contains more copper than that of the adult, and that it is more abundant in the actively growing cells than in older parts of green plants.³⁷ It has been shown, moreover, that in

advanced carcinoma, and in pregnancy, the serum contains an increased amount of copper.³⁰ With this group of conditions, in which the predominating factor common to all is cellular growth, it would seem that the catalytic activity exhibited by copper in hemopoiesis may very well be the explanation for the findings recorded. Finally, it seems more than coincidental that in a group of cirrhotic livers studied by Herkel, those described by him as hypertrophic (apparently those with more active and with a larger amount of hepatic parenchyma) contained more copper than those labelled "atrophic," an epithet seemingly appended to the more fibrotic organs. If copper caused cirrhosis of these livers, the more severely injured livers, and those in which its action had been more prolonged, would be expected to contain larger amounts of the substance responsible for the pathologic condition. Yet the direct reverse of this occurs in the recorded findings.

Whatever the part played by copper may be in the body, it is obvious that the liver is concerned with its metabolism. It is the organ through which part of the absorbed copper is eliminated, and bile of man contains copper in varying amounts at all times.⁵ Under normal conditions the amounts excreted would be expected to fluctuate with the intake. The amount actually required by the body for formation of hemoglobin, at least, is so small that that which is present as an impurity in the preparations of iron commonly prescribed in certain forms of secondary anemia and that which is contained in food, suffices. Under conditions of increased intake of copper, the amount excreted in the bile definitely increases, as shown by the experiments of Flinn and Inouye, and in Mallory's^{23, 34} animals subjected to large doses of injected copper, he demonstrated copper microscopically in the inspissated bile, while pigment gallstones have been shown to contain copper in amounts up to 10,000 mg. for each kilogram.⁵⁷

Oshima and Schönheimer found the livers in seventeen cases of hemochromatosis to contain three to four times the normal amount of copper. However, in a study of a series of cases of non-pigmentary cirrhosis, Herkel pointed out that although in two cases the content of copper was normal, in eight others it was as high as was claimed to occur in hemochromatosis. A typical case of hemochromatosis in which the patient recently came to necropsy at The Mayo Clinic was

studied in this respect. Analyses showed 0.72 mg. of copper and 930 mg. of iron for each 100 gm. of liver. The amount of copper in this liver was about 7.2 mg. for each kilogram, as compared to amounts ranging from 5.5 to 113.6 mg. of copper for each kilogram in Herkel's cases of nonpigmentary cirrhosis.

It must be admitted, therefore, that copper, when found to be present in the body, cannot summarily be regarded as a foreign toxic substance necessarily exerting deleterious effects. That it plays an important part in the animal economy and enters into the complicated mineral metabolic processes seem to be beyond cavil, while its predilection for the liver and its constant presence in the bile under normal conditions cannot be without significance. Still less is it justifiable to conclude that it is the sole cause of the widespread pathologic change and protein manifestations of hemochromatosis, even if it will, under special circumstances, lead to cirrhotic changes in the liver.

In order to determine whether more extensive studies of iron balance in a case of hemochromatosis would throw more light on the problems of the disease and of the iron metabolism, chemical studies were undertaken. The details of the study follow:

Report of Case

A man, aged fifty-nine years, was admitted to The Mayo Clinic in October, 1931. Between the ages of fifteen and twenty years he was concerned with gold mining and milling in California, after which he became engaged in a copper mine in Mexico for two years. During this latter period his occupation exposed him to the metallic fumes arising from the smelting process, and which he states were known to contain zinc, silver, arsenic and lead in addition to copper. For more than forty years he had been chewing the same brand of tobacco. This contained on chemical analysis 5 mg. of copper for every 100 gm. of tobacco. When in Mexico the patient contracted malaria, dysentery, and typhoid fever. He never became a chronic malarial subject. His gallbladder was removed for cholelithiasis ten years before his admission to the clinic.

So far as the present illness is concerned, the patient had had diabetic symptoms since 1928, and he had been treated for diabetes. Both his diet and the dose of insulin required frequent readjustment on account of marked instability in the level of blood sugar, resulting at times in distressing insulin reactions. Shortly before he came to the clinic it had been found elsewhere that he had an enlarged liver and splenomegaly. Roentgenologic evidence pointed to a mass in the epigastrium which was subsequently shown to be a large diverticulum on the superior border of the third part of the

duodenum, and to have no bearing on the pathologic condition present. He had been receiving medical attention at frequent intervals since 1928 so that the enlargement of the liver and spleen recently discovered apparently developed after the onset of the diabetes. The basal metabolic rate, determined elsewhere, was found to be sufficiently low to warrant administration of thyroid, but despite its use the patient still had not been relieved of the symptoms of fatigability and intolerance to cold. He further complained of headaches, constipation, and inability to control the symptoms of diabetes. The history was otherwise essentially negative.

Physical examination revealed bronzing of the skin of the exposed parts, not unlike that due to sunburn, but on closer inspection a definitely metallic hue was discernible. There was moderate enlargement of the liver and of the spleen. The thyroid gland was palpable.

The blood was essentially normal, but, in order that the report may be complete, the details will be given: hemoglobin 14.2 gm. for each 100 c.c., erythrocytes 4,000,000, and leukocytes 5,000 to 6,000 in each cubic millimeter of blood. The morphologic characteristics of the blood and the differential count were normal. Fragility of erythrocytes was normal. The proportion of reticulocytes was 1.6 per cent. Blood smears did not contain parasites. The serologic test for syphilis was negative. The iron content of the whole blood was 42.2 mg. and 43.3 mg. in each 100 c.c. respectively before and after administration of iron. Determinations of blood sugar varied between 0.08 and 0.20 mg. in each 100 c.c. Tests of hepatic function disclosed no retention of dye. The value for bilirubin was 3.1 mg. in each 100 c.c. of serum. The van den Bergh reaction was indirect and delayed. There were varying amounts of sugar in the urine at different times, and 0.04 mg. of lead in each 1,500 c.c., but the urine was otherwise normal. Copper or crystals of hemosiderin could not be recovered from the urine. The thorax was normal to roentgenologic examination. The stomach was normal. There was a large diverticulum on the superior border of the third portion of the duodenum. The colon was normal. Fractional examination of gastric content after a test meal gave negative results. Examinations of stool were negative.

A specimen of skin taken for biopsy from the inner surface of the arm disclosed the presence of iron pigment in the propria of the sweat glands and about the capillaries of the upper part of the cutis. This has been described as diagnostic⁴¹ for hemochromatosis (Fig. 3).

The single period studies previously reported seem inadequate for complicated metabolic experiments, so an attempt was made in the present study to determine the iron balance over longer intervals. The details of three periods (each lasting three days) are complete for critical analysis as shown in Table 1. No positive conclusions are drawn from the incomplete results of periods 2 and 5 because of the loss of parts of the specimens through breakage of receptacles. During periods 4 and 5, the ordinary diabetic diet, slightly modified for simplifying the studies, was supplemented with large doses of iron in the form of ferric citrate.

Homogeneous foods were selected, so that the portion used for analysis would be of the same composition as the food eaten. For instance, bacon was rejected because all pieces do not have the same proportion of

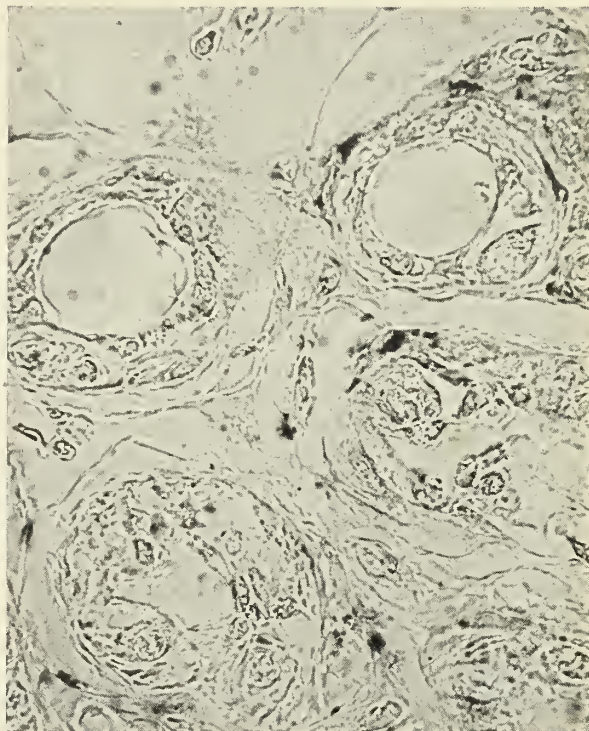


Fig. 3. Iron pigment in the propria of the sweat glands and about the capillaries of the upper part of the cutis (Mallory's potassium ferrocyanide stain).

lean and fat, and bread was served with all crust removed. Large oranges and tomatoes were used so that the part sent to the laboratory came from the same piece of fruit that was eaten.

TABLE I
STUDY OF IRON BALANCE

Period	Duration, Days	Intake of iron in food, mg.		Intake of iron as ferric citrate, mg.	Total intake of iron, mg.	Iron excreted, mg.			Balance, mg.
		Calculation	Analysis			Feces	Urine	Total	
1	3	31.12	20.1	0	20.1	11.7	0.74	12.44	+7.66
2	4	50.00	Lost	0		55.5	0.70	56.4	-
3	3	37.54	26.6	0	26.6	25.8	2.08	27.88	-1.28
4	3	37.44	32.3	935.0	967.3	714.3	1.09	715.39	+252
5	3	37.54	Lost	920.0	920+	906.0	1.05	907.05	+

In order to obviate errors in weighing, tenth portions of foods which were included in more than one meal were weighed at one time at the end of the day. Bread used throughout one day, therefore, was taken from the same loaf, cream from the same bottle, and butter from the same block.

Effort was also made to avoid contamination with

iron. Oranges were not sliced but sectioned. Aluminum utensils were used in cooking, and all foods were handled with silver forks and spoons. Bread, however, was sliced with a steel knife, but the crusts were broken off the edge, not cut. Triply distilled water was used throughout the experiment. The patient cooperated perfectly and no food was ever returned.

The urine for the corresponding period was collected in glass containers. Stools were collected in enamel dishes and pooled for the corresponding period of study. The different periods were "marked off" by the use of carmine in some instances and charcoal in others, as accurately as possible. All possible contamination with iron was avoided by keeping the specimens covered, and using wooden utensils in handling or transferring material.

Chemical analyses of urine were begun by adding a known volume of hydrochloric acid until the specimen was acid. One-tenth of the specimen was evaporated to dryness in a casserole, and was ashed in a muffle furnace until white, crystalline ash was obtained. To this ash, 5 c.c. of concentrated nitric acid was added, and this was evaporated to dryness in order to convert all iron into the soluble ferric salts. Then the nitric acid was distilled off by adding 5 c.c. of concentrated hydrochloric acid, and this again was evaporated to dryness. The residue was dissolved and made up to suitable volume, and the content of iron was estimated by the colorimetric method to be described.

The pooled specimens of feces for chemical analysis were dried over a steam bath. The specimens were numbered for record and, although the records will not be reproduced here, the numbers will be retained in the text. Specimens 1 and 3 were weighed, were powdered in a mortar, and an aliquot portion (5 gm.) was ashed in a muffle furnace. Oxidation was similarly completed by the use of concentrated nitric acid, and the latter was distilled off. The specimen was dissolved and made up to a suitable volume for colorimetric estimation of its content of iron. Specimens 2, 4 and 5 could not be satisfactorily powdered and were treated with concentrated nitric acid on a steam bath; the nitric acid was later distilled off with hydrochloric acid to dryness. The specimens were ashed, and the procedure then followed the method employed for specimens 1 and 3. The amounts of nitric and of hydrochloric acid used in the various stages of the analyses were all verified, so that the iron contained in them, if of significant amount, could later be deducted from the amounts of iron in the corresponding specimen.

As related before, a tenth portion of each day's food was saved for analysis. Specimens were boiled with successive portions of nitric and of hydrochloric acid. Due to the high content of fat, the specimens could not be directly ashed. Therefore the fat was first extracted with petroleum ether, and the partially fat-free material was charred. Then the petroleum ether extract was added in small portions to the latter again, and the ether was evaporated off over a steam bath. In this way all the fat was slowly replaced with the remainder of the specimen and charred. The containers were kept covered with glass all the time, so that any

material which might have escaped in the process of charring was caught on the watch glass and washed back into the specimen.

After being thoroughly dried over a steam bath, the specimens were ashed in a muffle furnace, the ash being dissolved as before and made up to convenient volume for analysis by colorimetric methods. Unfortunately, specimens of foods 2 and 5 were lost through breakage of the containers during transit.

Of the nitric acid used, a portion of 100 c.c., and of the hydrochloric acid, 200 c.c., were evaporated to dryness, dissolved, and made up to suitable volume for estimation of content of iron. The nitric acid was found to contain 0.0115 mg. of iron in each 100 c.c.; the hydrochloric acid, 0.0059 mg. of iron in each 100 c.c.

Of the ferric citrate used, 100 mg. was accurately weighed, ashed in the muffle furnace, redissolved, and made up to convenient volume for colorimetric determination of content of iron. It was found that 100 mg. of the ferric citrate used contained 15.87 mg. of iron.

Determination of the content of iron of each of the solutions prepared depended on the formation of the complex resulting from the combination of soluble ferric salts with ammonium cyanate. This was extracted by means of amyl alcohol as described by Kennedy, thus avoiding the difficulty of fading of colors as experienced in the method described by Elvehjem⁸ unless phosphates were previously removed. A drop of permanganate was also added to all specimens tested to insure complete oxidation of the iron salts into the ferric form. Ferrous ammonium sulphate (anhydrous) was used as a standard, to which permanganate solution was added to slight excess. Actual determinations were done by colorimeter. Analyses were made in triplicate.

In the first period there was retention of 7.66 mg. of iron. The second period had to be discounted on account of the loss of the specimen of food, but in all probability the subject was in negative balance, since the iron excreted exceeded the iron in the food as calculated from Sherman's tables. These tables gave, in all cases, as other workers^{26, 54} have found, figures higher than those obtained by actual chemical analysis. The third period showed a negative balance of the almost negligible amount of 1.28 mg. of iron. When the intake of iron was increased to the amount that it was in the fourth period, there was a massive retention of 252 mg. of iron, that is, 84 mg. a day. In the fifth period there was retention of a much smaller amount of iron, the actual figure being unavailable on account of the loss of food of that period. Since, however, it was small in comparison with the 920 mg. of iron administered in the form of ferric citrate, it cannot appreciably alter the result of that period.

Comment

Studies on normal subjects indicate that the requirement of iron varies somewhat with different persons, and, based on the principle of demand and supply, it varies with the same person from time to time. Thus, subjects studied by

Leichsenring and Flor²⁶ were all in positive balance on from 2.12 to 3.64 mg. of iron each day, and the investigators calculated the maintenance requirement to vary from 0.274 to 0.377 mg. for each kilogram of body weight each day. In similar cases, studied by Rose and her coworkers, however, subjects were all in negative balance in from 4.58 to 4.70 mg. a day, with the calculated maintenance requirements of 0.41 mg. for each kilogram of body weight, an amount rather higher than that found by the former investigators. Still more interesting is the fact that Reznikoff found a normal person to store 382.8 mg. of iron over a period of seven months, whereas in a case of polycythemia vera, in which there was increased hemolysis due to treatment with phenylhydrazine, 852.4 mg. of iron was stored over a corresponding period on a normal intake of food-iron. There appears, then, not to be a necessary correlation between the number of erythrocytes, the amount of hemoglobin and the iron balance.

Howard and Stevens obtained retention of 0.5 mg. of iron each day without recovering any iron from the urine. However, the amount of iron in the urine may exceed 0.5 mg., so that their subject may actually have been in negative balance.

In McClure's studies of iron balance in a case of hemochromatosis, the intake was 240 mg. in five days, about five times the normal intake, with a retention of 48 mg. over the period of study (that is, 20 per cent of the intake). Allowing for the iron excreted in the urine (which has been omitted in his calculation) the retention is still appreciable. But Leichsenring and Flor also made the observation that storage of iron immediately increased in normal subjects when the intake was doubled.

The results in period four of this study were identical with those just described. Why retention to the same degree was not seen in period five is difficult to explain on any other basis than that of supply and demand. It would seem that the previous high intake more than supplied the needs for further storage of iron. In the same way it is difficult to account for the fact that in some of the other periods there was storage, whereas in others, on practically the same intake, the subject was in negative balance.

On the whole the results obtained in this study of balance do not deviate appreciably from those obtained before in studies of subjects with hemochromatosis and in studies of normal subjects.

In evaluating the results of such studies of iron balance, and in seeking for the explanation of hemochromatosis, the facts which have already been established regarding the normal metabolism of iron must be reviewed. Here again these phases must be recognized: (1) its sources and its absorption; (2) its distribution and storage; and (3) its excretion.

It has been shown by microchemical methods that iron is absorbed mainly from the stomach and the upper part of the jejunum. The iron has been traced successively to the mesenteric lymph nodes, the spleen, the bone marrow and the liver. At a still later stage, granules of iron are said to be present in the mucosa of the cecum and the colon, where in the earlier stages of the experiment it had been absent. The usual assumption is that it is excreted by the large bowel.

Under ordinary circumstances, the iron contained in a normal diet (10 to 12 mg.) meets the demands necessary to maintain the metabolic process in which iron has been shown to share. Contrary to the usual supposition, this food-iron is mainly in the form of inorganic compounds.⁹

Recognizing the part which iron plays in formation of hemoglobin and in growth (since it is an important constituent of the nuclear structure of cells) little is known about its fate, once it is absorbed. It is not within the scope of this paper to consider the details of formation of hemoglobin beyond stating that food-iron, or iron therapeutically administered, plays an active part in the restoration of hemoglobin in at least some forms of anemia, particularly, as has already been mentioned, in the presence of small amounts of copper. But this is only one phase of the metabolism of iron.

The normal body contains about 3 gm. of iron, of which about a half is contained in the hemoglobin.⁵⁹ Whole blood contains 44.84 mg. of iron for each 100 c.c. in young men⁴⁶; 42.48 mg. for each 100 c.c. in young women; and 42.74 mg. for each 100 c.c. in a mixed group. Butterfield studied the iron content of the hemoglobin in different diseases and concluded that the normal figure is 0.34 per cent. Since hemoglobin is a definite chemical compound, its percentage of iron must therefore be a constant figure under all conditions. Riecker has drawn attention to what he termed a "partly diffusible iron compound" in the serum (normal 1.1 ± 0.022 mg. for each 100 c.c. of serum) which, according to his investigations, falls below normal in the iron deficiency

types of anemia such as follow continuous hemorrhages or dietary deficiency of iron. Riecker claimed that it forms a reliable criterion of the degree of iron deprivation and that normal values again can be established by suitable medication with iron, leading to restoration of the anemia and to clinical improvement of the patient. Again, in hemolytic anemia he found it to be increased. All these observations have since been confirmed by Locke and his coworkers.³⁰ Most of the organs contain only a trace of iron, and according to Morse this amounts to 0.01 per cent or less. The liver contains about 0.2 per cent.

Finally, the iron resulting from the normal process of hemolysis must be accounted for. Broadly speaking, the iron so released is in part excreted and in part utilized once again in the hemopoietic process, the iron-free fraction of hemoglobin being eliminated in the bile as bilirubin.³⁶

In the further analysis of this process, many important facts relating to the intrinsic iron metabolism are found to be lacking. It does appear that a breakdown of freed hemoglobin, into its structural units, is necessary before the iron-containing material can enter once again into the molecule of hemoglobin. Elvehjem has proved by experimental methods that inorganic iron is more readily available for hemopoiesis than is organic iron, indicating how firmly and intimately iron is bound in the organic compounds such as hemoglobin. Similarly, the changes which food-iron undergoes in the alimentary tract and in the organism after absorption are not definitely known. But it seems likely that in the liver⁷ it is changed to indissociable compounds, several of which have been found, and that it passes through several intermediate compounds before it is utilizable for formation of hemoglobin. Ferratin is regarded as one of these intermediate compounds.

The conditions under which hemolysis occurs in excess, and in experimental hemoglobinemia, throw light on the normal processes of intrinsic metabolism of iron. Here the spleen, bone marrow, liver and kidney contain excess amounts of iron. The view that the liver possesses a special ability to remove free hemoglobin from the blood stream was expressed by McMaster, Rous and Larimore. More recently, the work of Muir and Young, based on experimental hemoglobinemia and on microchemical studies of the liver, suggests that neither the hepatic cells nor the Kup-

fer cells take up hemoglobin as such, nor is hemoglobin excreted in the bile. It appears that iron reaches the liver secondarily, from deposits elsewhere, not as hemoglobin but in some other form, for whereas a distinct iron reaction is obtained in the renal cells in the early part of the experiment, this iron can be demonstrated in the liver only at a later stage.

Under normal conditions the body excretes about 10 mg. of iron daily, mainly in the feces.⁵² Whether this includes the fraction so constantly recoverable from the bile is a matter for conjecture. The question of an enterohepatic circulation of iron may be raised. It seems not unreasonable to suggest that the iron excreted in the bile has been changed into a form suitable for hemopoiesis and that it is reabsorbed from the bowel to enter into the formation of hemoglobin. Iron is excreted in lesser amounts in the urine. Under conditions where hemolysis occurs to extreme degrees, hemoglobinuria may result, the amount of iron so excreted by the kidneys being proportional to the degree of hemolysis.⁴⁴

The facts reviewed would indicate, among other things, that under normal conditions the body stores appreciable amounts of raw material for hemopoiesis, but whether the iron moiety is always in a utilizable form for formation of hemoglobin is entirely a different matter.

In considering the pigment metabolism as a whole, Whipple^{61, 62} assumed the existence of a "pigment complex" containing the essential parts of all the mature body pigments (including the iron-containing and hemoglobin-forming elements) scattered throughout the reticulo-endothelial system. This he represented graphically, indicating that the food, as well as the products of hemolysis and of the tissue cells, contribute to the pigment complex, and that it is the source of the essential elements for the building up of hemoglobin as well as for formation of bile and urinary pigment. Whether this conception is correct in its detail is unimportant, but it, too, stresses the idea of the existence of stores of the essential elements for regeneration of blood in the body at all times.

The iron content of the body may thus be subdivided into: (1) the hemoglobin iron, which constitutes 0.34 per cent of the hemoglobin³; and (2) the nonhemoglobin iron. The latter may be conveniently subdivided, and the first subdivision comprises "the function iron of the tissues" or "fixed iron" recently studied by Josephs²³ in ani-

mals and regarded by him as the iron of the cell nucleus. This is less constant than the hemoglobin iron, but a definite minimum level must at all costs be maintained at the expense of even the hemoglobin iron, and later at the expense of the growth of the animal during periods of iron starvation. Figure 4 illustrates the fall in the value of nonhemoglobin iron during iron deprivation to a level which cannot be reduced below 2 to 3 mg. for each 100 c.c. in the liver or 0.5 mg. for each 100 c.c. in the body as a whole. Josephs has produced experimental evidence to show that copper causes no apparent increase in the amount of "function iron" in the body, since in his feeding experiments the concentration of the tissue iron was not appreciably higher when copper and iron were administered together than when milk alone was given. On the contrary, in fact, when formation of hemoglobin was stimulated by administration of copper and iron the function iron actually decreased, but again never below the same minimal level obtained in the experiment cited.

The second subdivision of the nonhemoglobin iron is the stored or "mobile iron." This is extremely variable, depending on both exogenous (food iron) and endogenous factors (hemolysis and general cellular disintegration) which may cause wide fluctuations in this fraction of body iron. This conception and subdivision of the iron content of the tissues explain the apparent paradoxes encountered in the studies of balance previously described. The mobile iron serves as the source of hemoglobin iron which is changed in the liver to a suitable hemopoietic form. The view is here expressed that the "bile iron" is this iron or a part of it. It is impossible at this stage to state whether Riecker's⁴⁸ partly diffusible iron compound in the serum falls under this heading.

The metabolism of iron with particular reference to hemochromatosis.—The importance of the facts reviewed in understanding certain of the features of hemochromatosis is that iron pigment may be, under circumstances in which it is known to be in excess, widely distributed throughout the various organs and yet be out of currency, due to the inability on the part of the cells harboring it to excrete it. At the same time, although it may also be out of currency for hemopoiesis, there still remain the usual sources of iron for building of hemoglobin, so

that anemia need not occur as a result of deficiency of iron.

In carrying out a study of iron balance the only concern is with the beginning stages and

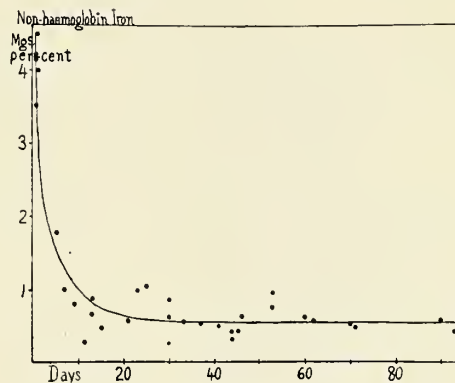


Fig. 4. Concentration of nonhemoglobin iron in rats fed milk only indicating a drop to a certain irreducible level (Josephs).

the final stages of a complex mechanism, the most important aspects of which remain untouched. The capacity of the body to store substances further complicates the study from this standpoint, particularly as the laws which govern excretion and absorption of such a substance are not well understood. Furthermore, determination of the iron content of the food and of the feces can have at the most a relative value, since, in estimating these amounts of iron in the feces, a certain proportion of this iron represents unabsorbed iron, taken by mouth, so that the actual amount excreted by the body remains an unknown quantity as much as the amount actually absorbed remains an unknown quantity. These facts are well illustrated by the accompanying diagram (Fig. 5).

However, if hemochromatosis is simply the result of retained food iron in amounts which will, during the known clinical duration of the disease, give rise to the accumulation of as much as 40 gm. or more (as in Sheldon's case), then, as Wilder has pointed out, the daily retention will be readily detectable in such an experiment. Mathematically, thus, he showed that it will require the daily retention of 20 mg. to accumulate the named amount over a period of five years, which is impossible, since the total intake of iron is usually less than this, and since there is, in addition, a daily loss of iron from the body even on a normal intake as is shown by our study as well as the previous balance experiments already referred to. In carrying this thought further

it cannot but be concluded that not only must the periods of retention of iron be much longer than five years, but probably extended to the duration of the patient's life, during which ac-

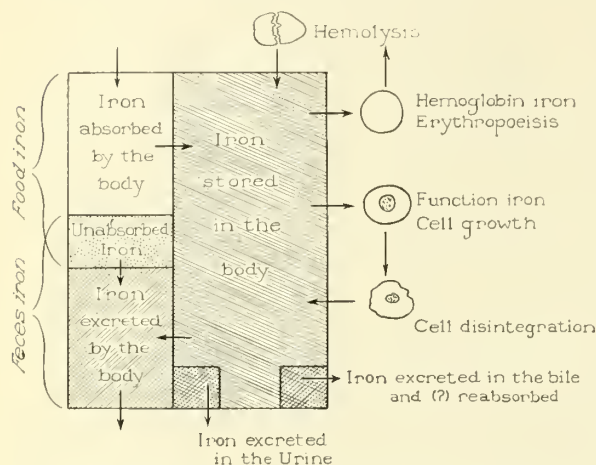


Fig. 5. Diagrammatic representation of the metabolism of iron, indicating: (1) the unabsorbed food iron excreted in the feces; (2) iron stores acting as a source of hemoglobin iron and the "function iron" for cell growth, and receiving the iron resulting from cellular disintegration and hemolysis in addition to absorbed iron; (3) iron excreted in the urine and in the bile. The serum iron is not indicated in this figure.

cumulation occurs slowly and in amounts which could not be determinable experimentally.

That a disturbance exists which interferes with the normal series of changes which complete the cycle of absorption, utilization, and the chain of events before final excretion of iron seems to be the probable explanation of hemochromatosis. It is justifiable to conclude that hemochromatosis is the result of faulty elimination of iron, the result of an inborn error of metabolism expressing itself (as Whipple has postulated)^{61, 62} as a disturbed intracellular circulation of iron, leading to increase in the amounts normally present, with ultimate destruction of the cell and replacement by fibrous tissue.

The rarity with which the disease affects women often has aroused comment. Mills^{39a} described the case of a woman thirty-one years of age, and mentioned two reports of disputed cases found in the literature. For the infrequency of the disease among women there seems to be no explanation. But then, there is no explanation of why gout, a metabolic disorder of a different kind, should occur almost exclusively among men.

Summary and Conclusions

An endeavor has been made to show that hemochromatosis is a definite clinical as well as

pathologic entity, that the mechanism underlying the cirrhotic and pigmentary changes as well as the diabetic syndrome of hemochromatosis is not explicable on the basis of that which ordinarily leads to these conditions when they occur as separate diseases. The multiplicity of hypotheses as to the etiology of hemochromatosis, as found in a review of the literature, reveals the incompleteness of knowledge of the disease. The evidence is insufficient to establish copper as the cause of hemochromatosis, although it may conceivably cause hepatic cirrhosis under certain conditions. It has been shown that its presence in the body, especially in the liver, is no evidence of it being a factor in the cause of the disease. There is no evidence to show that the excess iron in hemochromatosis is the result of excessive hemolysis or that retained food iron is itself the cause of the disease, since it occurs without the accompanying pathologic characteristics of bronze diabetes. The study of a case of hemochromatosis, together with its iron balance, is recorded, with an evaluation of the results of such studies. Certain aspects of the normal iron metabolism are considered in relation to its possible perversion in hemochromatosis. The view is here supported that hemochromatosis is due to faulty elimination of iron, not to simple retention of food or hemoglobin iron. There is an inborn error of metabolism, expressing itself as a disturbed intracellular circulation of iron, leading to injury and death of the cell and its replacement by fibrous tissue.

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GALLBLADDER DISEASE*

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GALLBLADDER disease as usually seen by the general physician is essentially a chronic disease that has been developing gradually and more or less insidiously for many years. In most cases there have been various vague symptoms of indigestion causing periods of slight abdominal distress with quiescent intervals; in some cases the distress is more constant and less intermittent, but usually with no definite symptoms pointing decidedly to the gallbladder as the cause of the trouble. After a varying period of time these symptoms become much more prominent

or perhaps an attack of definite gallbladder pain or even colic will cause the individual to consult his physician. If the attack comes on suddenly and is severe enough the diagnosis is usually made of acute cholecystitis. While acute cholecystitis undoubtedly does occur, most attacks of so-called acute cholecystitis are flare-ups or an acute exacerbation of a trouble that has been going on for some time. Graham says, "Clinical observation suggests that apparently in the great majority of cases a gallbladder that has once become infected remains so. On the other hand there seem to be undoubted cases in which a complete recovery occurs from a single attack of

*Thesis presented before the Minnesota Academy of Medicine, October 11, 1933.

acute cholecystitis." I believe that these attacks of acute cholecystitis severe enough to be diagnosed as such are not common; I cannot recall having seen any. All the sudden acute attacks of gallbladder pain that I have seen have had a definite history of indigestion or dyspepsia, or pathological evidence indicating a chronic process that had been going on for a considerable length of time. The only exceptions that come to mind have been a few patients with typhoid fever who developed gallbladder pain.

Etiology.—Gallbladder disease evidently results from several causes; and the causative agencies are carried along different routes. Ascending infection from the duodenum through the ampulla of Vater along the common duct and cystic duct, while formerly believed to be of very common occurrence, is now doubted by some investigators, including Fergusson, who thinks it doubtful if organisms reach the gallbladder through the common duct and cystic duct. Most writers, however, still include this route as one source of infection. The hematogenous route for infection is a double one. Infective organisms may enter the gallbladder wall through the hepatic artery following such diseases as pneumonia, influenza, and septicemia, while typhoid and colon bacilli probably frequently enter by way of the portal vein and are carried through the bile. Deaver says: "The recent work of Rose now indicated that the infection frequently arrives by way of the blood stream, having previously gained entrance to the circulation through any of the numerous small atria of infection which exist in the upper respiratory tract, or along the course of the alimentary tract from the mouth to the anus. Appendicular disease, tonsillar and sinus infections, and peridental suppuration are presumably the chief portals of entry for this type of infection, the organisms found being most frequently the streptococcus. Earlier writers thought that stasis of the bile was an important if not a chief factor in producing gallstones. Naunym concluded that when stasis of bile occurs, ascending infection follows and that groups of broken down cells added to by deposits of stone-forming material from the bile form the nuclei of stones. Undoubtedly infection is at times carried to the gallbladder from infected lymph glands and from inflammation in adjacent organs, as the liver, pancreas, and appendix, through the lymphatics as well as by direct extension when an inflamed duodenum or

colon may be in direct contact with the gallbladder.

Gallbladder disease is most common in adults past middle age, while cases under twenty are uncommon. It increases with each decade past twenty; three women have the disease to one man, and it is more common in women who have borne children than in nulliparæ. Obesity seems to favor the disease and the old saying, "fair, fat, and forty" is very applicable to this trouble. Certain diseases, such as typhoid fever and appendicitis, seem prone to result in the disease. Deaver in a large series found a typhoid history in 5.5 per cent. It is especially common to find it associated with a diseased appendix and in most cases of gallbladder disease if the appendix has not been previously removed it will be found diseased.

Pathology.—In gallbladder disease the pathology varies a great deal, but undoubtedly the disease is located chiefly in the wall of the gallbladder and not in its contents; from this it extends to include the liver, bile ducts, and often the pancreas. The pathologic picture very often does not check up with the clinical picture. As Judd says, "It is impossible to predict during an attack the severity of the underlying lesion for few or very mild symptoms may accompany severe infection, and, on the other hand, an apparently mild infection of the gallbladder may create an alarming clinical picture." The pathological changes may vary from a mild infiltration of the mucosa causing a slight swelling to a gangrenous necrosis of the entire gallbladder. In its mildest forms the gallbladder is not enlarged and the only change present may be a slight thickening of the mucosa with leukocytic infiltration. As the disease progresses, the infiltration extends deeper until it involves all the coats of the gallbladder, its wall becomes thickened, its peritoneal sheen is lost; its color changes to a reddish pink or to a dirty gray and the formation of calculi is usual. From this stage, as the inflammation increases, the gallbladder may become adherent to surrounding organs or tissues, including the stomach, duodenum, large or small intestines, liver, or omentum, and pancreas. Such a gallbladder usually contains stones but the number varies greatly from a single stone to several hundred. To quote from Delafield and Prudden: "If the disease is chronic the wall of the bladder may be thickened and bound to adjacent parts by fibrous tissue; polypoid growths may

occur in the mucosa; the duct may be occluded; dilatation, ulceration, the formation of gallstones, calcification, and atrophy may occur. In inflamed gallbladders the penetration of the fibrous and muscular coats by deep processes of the lining epithelium, Luschka's ducts, may lead to an erroneous diagnosis of carcinoma."

Often a stone will become impacted near the beginning of the duct, or even become adherent there. Such a stone may occlude the duct, allowing no more bile to enter nor any of the contents to be evacuated. When this condition is present the gallbladder may become greatly enlarged and its walls tremendously thickened. If none of its contents can escape, the bile pigment is gradually absorbed and the numerous microorganisms increased, resulting in what is known as an empyema of the gallbladder. The gallbladder becomes very tense due to the great distention, its walls become hard and stiff so that compression is impossible. In such a gallbladder there are frequently areas or patches of black gangrenous mucosa with sloughing of smaller or larger areas present inside, and often many adhesions to surrounding tissues due to localized peritonitis. If the condition continues, perforation may occur at one or more of these gangrenous areas, usually in the distal half. If the gallbladder has previously become adherent to a surrounding viscus the perforation may extend through the adherent walls into that organ; if the perforation occurs into the free peritoneal cavity, peritonitis and death usually results. Perforation into the liver with abscess has been recorded and a very few cases of fistula through the abdominal wall and skin are on record. In some cases the contents of an empyema are absorbed, leaving a small amount of thin whitish fluid, and a small shrunken thin-walled gallbladder may result, especially if the impacting stone completely closes the entrance to the gallbladder so no more bile can enter. Such a condition does not relieve the patient of his symptoms, however.

Gangrene of the entire gallbladder due to occlusion of the cystic artery has been reported.

A rather curious and not thoroughly understood condition is known as cholesterosis of the gallbladder in which infection does not seem to be a factor but rather a disturbance of cholesterol metabolism. Such a gallbladder is commonly known as a "strawberry" gallbladder and more often contains no stones. Judd says: "The many clinical cures reported by removal of a 'straw-

berry' gallbladder without stones would indicate that perhaps the removal of this one link from the chain of disturbed cholesterol metabolism stops the process and allows the condition to return to normal." A good deal of work on cholesterosis has been done by Aschoff and Baumeister, Judd, MacCarty, Boyd, Gossed, Bertrams, and Loewy. In cholesterosis a lipid deposit which is an ester of cholesterol is found in masses of epithelial cells in the tips of the villi of the mucosa of the gallbladder; the strawberry gallbladder is the first stage of an aseptic process which can eventually set free concretions of cholesterol in the interior of the gallbladder. A cast off villus that contains cholesterol forms an ideal nucleus for further deposit of cholesterol with the formation ultimately of stone. . . . "The characteristic pathological feature of cholesterosis is a deposit of cholesterol in the subepithelial cells of the mucosa of the gallbladder. On gross examination they appear as small yellowish-green areas resembling strawberry seeds. Other than this the gallbladder may be normal on gross and microscopic examination" (p. 44). In spite of a lack of more definite pathology to be found in the gallbladder, cases with quite typical gallbladder symptoms are cured by cholecystectomy.

Changes in the liver often follow gallbladder disease, varying from fibrous streaking of a thickened capsule to enlargement, cirrhosis, and abscess formation. In Deaver's series the liver was involved in 5.6 per cent of calculus cases and in 3.5 per cent of noncalculus cases. Graham states that an associated hepatitis is present in all cases of cholecystitis with an inflammation around the intrahepatic bile ducts (pericholecystitis). Obstruction may occur if this inflammation is severe enough and causes jaundice. With gallbladder disease the deep lymph nodes are often enlarged and may even become purulent. Pancreatitis to a greater or less extent may be present, the inflammation ascending from the common duct up Wirsung's duct, by direct extension, or by a hematogenous or lymphatic route. Jaundice may or may not be present but usually is not as marked as in carcinoma. It is usually caused by obstruction to the hepatic duct which may be caused by a stone in the common or hepatic ducts, or by inflammation with leukocytic infiltration of the intrahepatic ducts.

Tumors of the gallbladder include fibromata, but they are rare. Adenomata and papillomata are occasionally found. Carcinoma of the gall-

bladder is the most frequent tumor and constitutes from 5 to 6 per cent of all primary carcinomas. Gallstones are present in a great many of these cases, statistics varying from 69 to 100 per cent.

Symptoms.—While the classical symptoms consist of attacks of severe pain in the right upper quadrant of the abdomen, extending through to the back and right scapula region, recurring at irregular periods without apparent cause, lasting from a few hours to several days, of such great intensity that a physician must be called and morphine given, if one waits for this picture he will miss at least half of the cases. Biliary colic is usually a comparatively late symptom that follows a long period of indigestion. The earlier symptoms as given by most patients are those of indigestion that has been present to a greater or less degree for many years. In most cases this has been more or less constant but always there is a history of frequent periods during which it was much worse. Particularly do these symptoms of distress follow over-eating. Over-eating seems a more frequent factor than eating a particular article of food, though as a rule certain articles such as apples, cabbage, tomatoes, and pork have to be restricted or eliminated. Distress in the epigastrium coming on very soon after eating; regurgitation, sour stomach, gas formation, belching, a feeling of distention and pressure, a heavy full feeling are the most common earlier symptoms; nausea and vomiting are apt to occur at intervals and bilious attacks come frequently. Some patients describe their symptoms as a burning or gnawing sensation. As the case progresses distress becomes more constant, the severe attacks more common, and more care and attention must be given to diet and the avoidance of over-eating. The patient is likely to be more inconvenienced during the evening and night; any person who occasionally or frequently is awakened from his sleep by upper abdominal pain or distress, especially after midnight, should always be regarded as likely to have gallbladder disease. In most cases there is no fever; however, some individuals have a definite chill, or chilly sensations, and fever may be present up to 102. Leukocytosis from 12,000 to 18,000 is common. Pain in the severer attacks frequently extends into the lower right chest, and sometimes causes impairment of breathing on this side. The pain sometimes extends to or is located in the center of the epi-

gastrium, and in a few cases is chiefly to the left of the center, under the left ribs. It is not at all uncommon for the pain to extend from under the right ribs straight through to the back or up the back to the scapula. Pain in the shoulder is uncommon. As the disease progresses and becomes more chronic the patient usually has at times attacks of pain that are more severe and last longer; mild jaundice may or may not appear but usually is not severe.

Differential Diagnosis.—The main diseases to be differentiated are coronary disease, pneumonia, pleurisy, appendicitis, pancreatitis, stomach ulcer, intestinal obstruction, kidney stone, infections of the upper urinary tract, and malignant diseases of the stomach, intestines, and gallbladder tract. Before any abdominal diagnosis can be made, inflammatory disease of the chest cavity must be ruled out. All too frequently pneumonia with its pleuritis pain has been diagnosed as an acute abdominal condition and the patient subjected to an operation; very frequently the pain of pneumonic disease is located in the upper abdomen in exactly the same place that a gallbladder pain is commonly found, and with it definite abdominal rigidity and tenderness, chill, vomiting, and a serious general appearance. In gallbladder disease there is almost always a history of previous trouble in the upper abdomen, absence of all lung signs except possibly restricted breathing on the right side, and entire absence of any throat symptoms. If in doubt an x-ray film of the chest will almost always show whether pneumonia or pleurisy is or is not present.

Appendicitis is so often associated with gallbladder disease that it is often impossible to be certain which condition is causing the more trouble; not infrequently an appendix pain will start higher than usual and make one suspicious of an attack of gallbladder trouble; but if the attack is severe it usually is definitely diagnosed in a short time by the pain and tenderness shifting lower in the abdomen. In a very few cases a gallbladder pain has started over McBurney's point, stayed there, and at operation a normal looking appendix found with gallstones present in the gallbladder. Very frequently both diseases are causing the trouble and in these the diagnosis is generally fairly easy.

Peptic ulcer, either of the stomach or duodenum, not infrequently simulates gallbladder disease and sometimes the diagnosis is not made until operation. Occasionally both conditions are

present in the same patient at the same time. A careful history should usually give one a fairly good idea as to which condition is present. In ulcer, relief is generally experienced by eating light food or drinking milk, as well as by alkaline treatment. In gallbladder disease on the contrary, food usually causes distress and the relief from soda may or may not be present. In ulcer, the distress is greater after the period of digestion is over, two and a half to three hours after eating, while that from gallbladder comes very quickly after a meal, usually in ten minutes to half an hour. If night pains come, those from ulcer are apt to be before midnight while the gallbladder night pain is after midnight in the majority of cases. The x-ray will usually give very definite information regarding either or both, and in doubtful cases may be the deciding factor.

Intestinal obstruction is not so often confused with this disease as the pains in obstruction are more crampy and colicky and intermittent in character. In the majority of cases of obstruction the pain is located lower down in the abdomen and more often nearer the midline. Wangenstein's sign is present if looked for carefully, and a flat x-ray film will usually give definite signs.

Kidney stone is often confusing, especially if the x-ray shows what looks like a stone in the right loin or side. A stone on a flat film is far more likely to be a kidney stone, and a ureteral catheter will usually clear this point. Pus or blood in the urine should make one suspicious of a kidney condition also. Another point, brought out particularly by DeQuervan, is the location of muscular rigidity. In a kidney condition the muscular rigidity if present is in the loin or back behind the kidney a short way below the rib; in a gallbladder pain the rigidity is just below the ribs in the front or in the epigastrium. The history is important here also.

Malignant disease is usually slow in developing, with a history of a few months rather than years. Loss of weight as well as cachexia should be viewed with suspicion. Jaundice that is unusually severe and that continues for weeks is apt to be malignant, as gallbladder jaundice usually is comparatively slight and transient.

Coronary disease can usually be diagnosed definitely by an electrocardiogram. With the growing incidence of this trouble it should always be considered in making a diagnosis.

To recapitulate, the earlier symptoms are commonly those of indigestion or dyspepsia characterized by gas, belching and distention, coming on shortly after eating and more commonly in the evening; sour stomach, heartburn, and eructations are common. Relief from soda is occasionally described but eating aggravates rather than relieves the distress. When these symptoms of dyspepsia continue over a period of time and then are followed by occasional attacks of radiating epigastric pain or by pain of a less severe character but with some jaundice and septic symptoms, when there is a low gastric acidity and a negative gastric roentgenogram, one should always be suspicious of gallbladder disease; if to this is added tenderness below the right ribs and absence of shadow in a cholecystogram after taking the dye the diagnosis should be fairly certain. Attacks of typical biliary colic with pain so severe as to require morphine can usually be diagnosed at once.

Cholecystograms are a great aid in diagnosis; while not positively diagnostic in most cases they add a great deal of information and help complete the picture. Absence of a gallbladder shadow on the fourteen and sixteen hour films after the administration of the sodium tetraiodophenolphthalein dye is the most definite and reliable sign given. A faint shadow is of scant value and gives but little information. Most authorities claim that absence of shadow when the dye is given is positive in 95 per cent of cases as checked by operations. The presence of shadow is of much less value, as 15 to 20 per cent of these cases will show stones at operation. Stones are shown on the x-ray films in about 15 per cent without the dye and in about 40 per cent when the dye is used. Graham and his associate at Barnes Hospital in St. Louis prefer the intravenous method of administration of the dye. They inject normal saline solution into the vein and while the saline is running in they inject the dye through the rubber tube with a hypodermic needle. Graham claims greater accuracy and a higher percentage of correct diagnosis, though he admits that there is a certain amount of danger and that deaths have followed. Most men now are administering the dye by mouth and find this method very satisfactory.

Gallstones give essentially the same symptoms as cholecystitis without stone; but usually in cases with calculi the symptoms are more marked

and more severe, the attacks sharper, more sudden in onset as well as in relief.

When jaundice is present one must think seriously of common duct stones or of obstruction in the common duct. Jaundice may be caused by liver damage due to blocking of the intrahepatic ducts as well as by carcinoma. The serum bilirubin test is especially valuable in determining the severity of the jaundice, and is of particular value in ascertaining whether it is increasing or diminishing. A mild jaundice that tends to lessen in severity in a week or two and in which the serum bilirubin is diminishing, especially if it came on with or following an attack of pain in the gallbladder region, is usually due to gallstones in the common duct; particularly is this true if the case history indicates previous attacks of gallbladder trouble. A jaundice due to cancer does not usually clear up but rather tends to increase without remissions.

Complications. Probably the most common of gallbladder disease results from it as a focus of infection. Lumbago, sciatica, arthritis, irritable heart, are the most common sequelæ and have been frequently cured by cholecystectomy; naturally indigestion and dyspepsia and constipation are quite commonly relieved by operation. Just what the connection is between cholecystitis and appendicitis is not definitely known; it may simply be that both have the same cause; but certain it is that a great many cases of chronic gallbladder disease are associated with a diseased appendix—so many that it seems more than accidental.

Treatment. In the early stages of gallbladder disease, if the infection is not too severe, medical and hygienic treatment may be of some value. Diet is of value, and, of even greater importance, general hygiene and exercise, posture, and the abolishing of constricting clothing. Magnesium sulphate administered by the duodenal tube as advocated by Lyons may be of help in draining the gallbladder. It is also of some help given by mouth for its cathartic action.

Except in these early cases, the treatment is strictly surgical, and experience is showing that in chronic cases with definite symptoms, especially when the distress is increasing or if definite attacks of pain are present at frequent intervals, surgery not only gives the only permanent relief but is advisable in order to prevent serious complications at a later date. When we consider the numerous instances of tremendously dis-

tended gallbladders with inflammatory adhesions covering the entire wall of the gallbladder, of marked adenitis, and secondarily diseased liver and pancreas, of adhesions and rupture into other organs as well as the occasional rupture into the free peritoneal cavity, we must think seriously before advising procrastination. Added to this is the fact that nearly all cancers of the gallbladder are accompanied by stones. While the results following cholecystectomy are not perfect, the percentage runs about 85 per cent for entire relief of all symptoms where stone was present, and 75 per cent for noncalculus cases. Undoubtedly in some of the noncalculus cases the diagnosis may have been wrong.

As to when to operate there is some dispute. A great many authorities advise waiting until an acute attack of pain has subsided. Were one able to ascertain definitely which cases will subside and which will go on to rupture, the question would be simple. But so often the symptoms of a very greatly distended gallbladder with definite gangrenous areas are no more severe than the ordinary biliary colic so that a differentiation cannot always be made. To allow a gangrenous gallbladder to wait is dangerous, and until diagnostic methods are discovered which will indicate the severity of the case far better than any we now know it seems better and safer to operate if the symptoms in these severe cases persist more than two or three days without definite easing. Probably in some of these very severe cases cholecystostomy may be safer; but in the majority cholecystectomy can be done.

There is a tendency to overlook some cases of gallbladder disease in the earlier stages; in quite a number the diagnosis is missed for many years until finally a rather severe attack of pain or distress makes the diagnosis self evident. Even then many patients are not advised to have an operation. In view of the very serious results that so often follow repeated attacks over a period of years, the mass of inflammatory adhesions and exudate that forms, the damage caused to the liver, pancreas, and general system, it would seem far better treatment to have the gallbladder removed early before this serious picture develops. When one considers the special complications that occasionally follow, such as perforation, localized or general peritonitis, and the possibility of a malignant condition developing, any one advising medical treatment or a prolonged waiting period must in justice to his

patient have a very definite and valid reason for so doing.

My series during the past ten years is eighty cases; in fifteen of these there was an empyema of the gallbladder, in most of which there was marked distension. Five patients had definite gangrenous areas in the wall of the gallbladder; in two the gallbladder was adherent to the transverse colon and had perforated and was draining into the colon. There were five deaths, two being caused by pneumonia, one by an uncontrollable hiccup, one by a duodenal fistula resulting from the breaking up of adhesions in a very old woman, and one from shock. In all cases a cholecystectomy was done, except in one, and in that one a cholecystectomy followed the cholecystostomy ten days later. In all cases of gangrene, and in most of those with empyemas, a cholecystectomy was done early, within the first three or four days; most of these patients were very sick, but all recovered, and convalescence was surprisingly smooth. Seventy-two per cent had calculi, including one carcinoma of the gallbladder; thirteen were men and sixty-seven women. Ages ranged from sixteen to eighty-four. Two girls, one sixteen and the other seventeen, both had calculi present. Twenty-four of these patients had had a cholecystogram; of this number twelve (50 per cent) showed no shadow, six (25 per cent) a poor shadow, four (16.6 per cent) a good shadow, and two (9 per cent) showed stones. We have been able to follow sixty-five of our series and fifty-six are practically symptom-free, seven are fair, and two are not improved. In forty-three cases we removed the appendix at the time the gallbladder was removed, and in ten cases it had been previously

removed. One patient had had a cholecystostomy twenty years before, and later, some six years prior to our operation, a fistula had formed which drained bile through the skin and which was still patulous at the time we operated. Since we removed the gallbladder in July, 1931, she has been well. Two patients had pelvic adhesions and each had a diseased tube removed in addition to the gallbladder.

The two in which the gallbladder was draining into the colon were each having attacks of pain. One of these was especially interesting as the rupture into the colon occurred while in the hospital. She was admitted in July during my absence. She was having very severe pain with vomiting, and she had a large mass under the ribs, more to the right than in the middle. She was a very sick woman and supportive treatment was used preparatory to operation. On the third day the pain eased up very materially and the next day the tumor was considerably smaller and less tender. She refused operation and went home. Her next attack of pain was after a heavy dinner on Thanksgiving Day; the following day she came back for the operation. The diagnosis in July had been a stone impacted in the cystic duct which was thought to have become loosened, allowing the distended gallbladder to drain.

Nearly all of our cases have been drained. We now follow Graham's plan of making a stab wound to the right of the incision and introducing a Penrose drain through this opening which is carried to the stump of the cystic duct. It is usually removed in forty-eight hours and we find this quite satisfactory.

QUACKERY AND PHYSICAL THERAPY

A quack is generally defined as a person who makes claims for skill that he does not possess, especially medical skill. The quack in the field of physical therapy, as is pointed out by Dr. C. B. Heald, is more likely to make the claims for the machines than for his particular ability in operating the machines. In his consideration of this subject, Dr. Heald has set down certain limitations to determine who are qualified to practice physical therapy either as physicians or as lay technicians. He recognizes that no lay technician should use such devices on the sick without medical prescription and without repeated supervision of the patient by the physician. The responsibility for the care

of the patient is not that of the technician but that of the doctor whom the patient consults. Heald feels that all physical therapeutic measures in the hospital should be under the control of one department, not with light treatment in the department of dermatology, massage in the department of orthopedic surgery, and the electrical devices for stimulating nerves and muscles in the department of nervous and mental disease or in the radiologic department. The American medical profession has its own Council on Physical Therapy, which already has contributed largely to the control of charlatanism in this field and which, as it gains momentum, will probably do even more effective work in this direction. (Jour. A. M. A., November 5, 1932, p. 1606.)

ACUTE CONDITIONS OF THE GALLBLADDER*

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ACUTE conditions of the gallbladder are perhaps the most important upper abdominal lesions in surgery. The chief etiological factors attributed to these conditions are: (1) disturbed metabolism of cholesterol and its solvents; (2) infection; and (3) obstruction of the bile ducts.

A differential diagnosis of gallbladder disease is frequently difficult because of the close proximity of the gallbladder to the liver, duodenum, colon, pylorus, right kidney, pancreas, and diaphragm. An early and definite diagnosis is important because of the satisfactory and permanent good results obtained from timely operation. An accurate and comprehensive history and physical examination are very necessary in arriving at a definite differential diagnosis.

A typical case of gallbladder disease usually gives little difficulty in arriving at an accurate diagnosis, but an atypical case may simulate many other conditions. In these cases some factors are very important and quite constant in the history and observation of the patient. Everything at our command is sometimes necessary to determine not only that the gallbladder is the organ affected but also just what stage of the disease is present.

In the history, pregnancy, typhoid fever, attacks of colic without jaundice, and attacks of mild diabetes are sometimes important.

In gallbladder disease, if there is a history of previous attacks, the intervals are usually quite irregular and digestive disturbances are usually present. The digestive disturbances are manifested by distress soon after the ingestion of food. The patient will call attention to certain types of food that cause distress. This distress is accompanied by bloating and belching. When there is pain, it comes on suddenly, is located at the right costal margin and is transmitted through to the scapula. The pain usually ends abruptly but may continue unabated except when relieved by narcotics.

The pain may be relieved by vomiting but not

so frequently as in the case of gastric or duodenal ulcer. The vomitus is usually bile-stained, in contrast to the blood-stained vomitus of ulcer. The gallbladder attack gives a sense of fullness. The patient frequently speaks of having a sensation of the presence of a lump in the epigastrium. The distressing sensation in the case of ulcer is usually of a gnawing or burning character. In gallbladder disease the patient frequently belches volumes of gas, while with ulcer sour eructations are more common.

Acute pancreatitis may be confused with acute conditions of the gallbladder, but in the real acute hemorrhagic pancreatitis the pain is more severe and very early the symptoms of prostration and toxicity are more marked. Here the pain radiates through to the lower dorsal or upper lumbar areas.

Right-sided renal infection, especially pyonephrosis, may simulate empyema or other acute infections of the gallbladder. The urinary contents and palpation may aid in ruling out this condition. Right subphrenic abscess may be confused with acute gallbladder conditions. In the latter, a history of some antecedent infection will frequently give us a clue to the diagnosis.

Acute gallbladder disease has been confused with pneumonia, pleurisy, catarrhal or infectious jaundice, acute yellow atrophy, cirrhosis, syphilitic hepatitis, herpes zoster, Pott's disease of the spine, and coronary thrombosis.

The type of infection in the gallbladder has been a matter of much difference of opinion. Rosenow and Brown consider streptococci to be the chief etiological factor, with the colon bacillus a secondary infection. Williams and McLachlan hold to practically the opposite opinion. They give the colon bacillus as the most frequent offender, with streptococci as a secondary infection.

Mann produced acute cholecystitis and destruction of the gallbladder wall with intravenous injection of chemical solutions. In many acute conditions, and even with gangrene present, no bacteria have been found.

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Osler classified the various types of acute cholecystitis as catarrhal, suppurative, phlegmonous, gangrenous, and membranous.

The ordinary acute cholecystitis may pass through several or all of these various stages. Our great problem is to decide just what stage of the condition is present before the abdomen is opened. The great mass of literature on gallbladder disease applies only in slight degree to acute conditions.

The patient with an acute condition does not so often reach the great surgical centers from which much of our statistics is obtained.

Deaver reported only two acute cases in a series of 328 gallbladder operations.

The Boston City Hospital, over a period of six years, reported only 226 acute conditions of the gallbladder. And of 1,000 cases of operative gallbladder conditions at Johns Hopkins, only 234 were acute.

Baumgarten, of the Mayo Clinic, studied 4,575 gallbladders removed surgically. Sixty of these gave evidence of a gangrenous condition.

Gibbon, in 1902, remarked that gangrenous cholecystitis was sufficiently rare that every individual case should be reported.

Vest recently collected seventy-one cases from the literature and discussed the condition at length. He reported a case in a boy ten years old. Czerny says a solitary stone wedged in the cystic duct may produce pressure on the cystic artery and cause gangrene.

The cystic artery is practically an end artery. A rapid cutting-off of the blood supply may produce gangrene early, but a slower process may produce an empyema followed by gangrene.

Opinions differ widely as to the treatment of acute conditions of the gallbladder. If we could rely on the acute condition subsiding, no doubt the interval operation would be more safe. In a large series of cases, however, we would find that it frequently does not subside but progresses to a point where operation becomes hazardous.

We attempt to follow the following procedure: If the general symptoms subside after the first pain is relieved or during the ensuing twenty-four or forty-eight hours, operation is delayed. But if the severe pain and general symptoms persist after forty-eight or seventy-two hours and the patient is relieved only by narcotics, the pain returning as soon as the effect of these has worn off, then operation is seriously considered. If the

leukocyte count is high, and a mass can be definitely palpated at the right costal margin, and all symptoms tend to advance rather than recede, we believe operation is imperative unless there is some definite contraindication. These latter cases usually mean that the cystic duct is blocked.

In empyema of the gallbladder, Dennis first called attention to the fact that it is usually the distal end of the cystic duct or the pelvis of the gallbladder that is obstructed.

Halstad called attention to the fact that in these cases the gallbladder can usually be palpated at the liver margin.

Passing from the gallbladder to the common duct, the distance between the cystic duct and artery gradually increases. Therefore, a stone in the pelvis of the gallbladder or distal end of the cystic duct is more likely to produce pressure on the cystic artery than one close to the common duct. Here the obstructing body shuts off the circulation of the gallbladder and also blocks the exit of its contents.

Ravdin showed that the damaged gallbladder absorbs water slowly. If the damage is severe and the cystic duct is obstructed, fluid is taken up through the gallbladder wall, thus adding to its contents and producing hydrops or empyema. Chemical substances normally in the blood enter the gallbladder with this fluid. Stasis, tension, and impaired circulation pave the way for either bacterial or chemical destruction.

Ravdin has also shown that the normal gallbladder removes certain substances from the bile and returns them to the body fluids, but that the damaged gallbladder shows a tendency to a reversal of this function. This chemical substance retained in the gallbladder may aid in the process of disease.

The basis of this paper is a report of sixteen cases with complete blocking of the cystic duct. In all of them an acute empyema was present, with varying stages of gangrene existing in seven of the sixteen cases.

Ten of the sixteen patients were operated upon within seventy-two hours from the time of onset of the attack. In all these a cholecystectomy was done.

The eleventh patient showed a more mild and more gradual onset. This patient was operated on the fifth day and a cholecystectomy was done.

The twelfth patient was operated upon within

seventy-two hours, but the gallbladder had perforated and a general peritonitis was present.

The thirteenth patient was operated on the fifth day but the extensive inflammation and

hours, but then had to be repeated. On the second day a pear-shaped mass could be palpated at the right costal margin. The abdomen became more distended and the general symptoms increased. On the third day the temperature rose to 102°, pulse 110, and leukocyte count

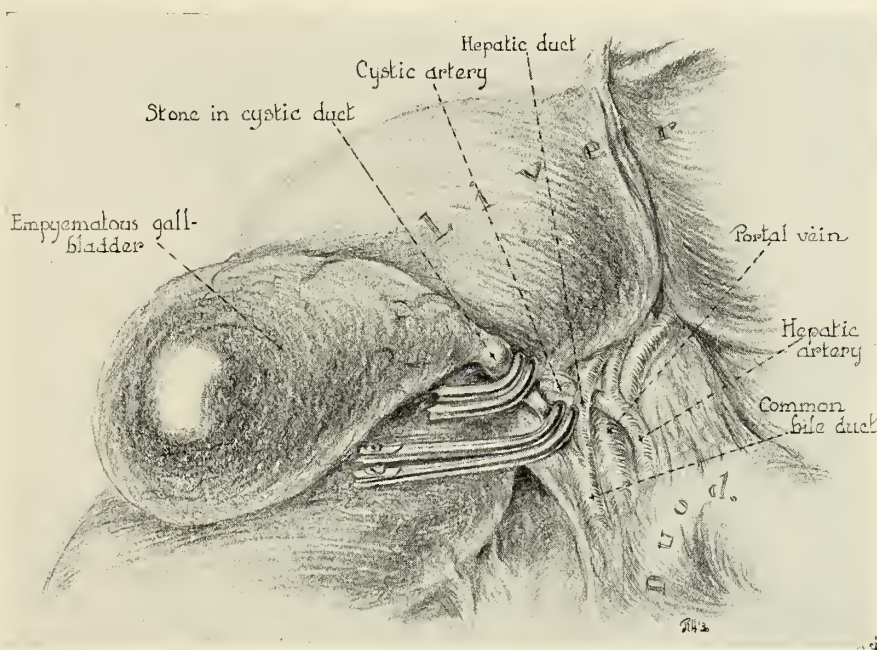


Fig. 1. Drawing of the condition in Case 3. This shows the stone in the distal cystic duct pressing on the cystic artery. The portion of the cystic duct between the clamps appears about normal. The inflammatory process here is confined almost entirely to the gallbladder. It has not yet become adherent to adjacent organs.

necrosis of the gallbladder made cholecystectomy impossible.

The fourteenth patient—a very poor risk—was not operated upon until the sixth day. The gallbladder had perforated and the patient expired as soon as the abdomen was opened.

The fifteenth patient was operated upon elsewhere, several days after the onset of the attack, and a cholecystotomy was done.

The sixteenth patient died of a coronary thrombosis on the third day after the onset of the attack. We were still pondering on the advisability of operating.

I will give a brief history of some of these cases. The first ten had much the same history, findings, and ultimate results and I shall mention the details of only a few of these.

Case 1.—Mrs. O. L., aged twenty-eight, had the first attack of epigastric pain eleven years before the operation, similar attacks six years later, and a third attack one year before operation. In the final attack the pain was severe at the right costal margin, radiating through to the scapula. Nausea and vomiting were present. Morphine by hypodermic gave relief for twelve

16,000. There were a few casts and some albumin in the urine.

At this time a high right rectus incision was made under local and ethylene anesthesia. The gallbladder was about three times its normal size and so tense and necrotic that it could not be retracted except by traction on the cystic duct. The obstructing stone was in the pelvis of the gallbladder and apparently most of the inflammatory process was confined to the gallbladder. The proximal end of the cystic duct appeared about normal. The cystic duct was doubly ligated close to the common duct with chromic catgut. The duct was severed between clamps and both cut ends treated with iodine. The gallbladder was then easily peeled from its bed with the gloved finger. A small penrose drain was inserted and the wound closed. The patient had a very mild and smooth convalescence. She left the hospital on the tenth postoperative day and has been well since.

Case 2.—Mr. C., aged forty-four, gave no history of previous gallbladder colic. Two days before operation he was seized with a sudden, severe pain at the right costal margin at 2 a. m. One-fourth grain of morphine relieved the pain for three or four hours, when it had to be repeated. The patient vomited all that day and complained of pain as soon as the effects of the morphine wore off. On the second day the abdomen

became distended and rigid, the rigidity being more marked over the right rectus muscle. On account of the extreme rigidity, we could not be sure of palpating the gallbladder. The leukocyte count was 22,000; temperature 100.2°.

At this time the abdomen was opened under spinal anesthesia. Again the inflammatory process seemed mostly confined to the gallbladder. The gallbladder was tense, necrotic and full of pus and stones. The gallbladder was removed, as in the previous case. The temperature returned to normal on the third postoperative day and all symptoms subsided. The patient was discharged from the hospital on the eleventh day and has been well since.

Case 3.—Mrs. K. S., aged forty-seven, had had three previous attacks of gallstone colic, the last of the three having been six months before the final attack. Three days before operation the patient was awakened in the night with a severe attack of pain at the right costal margin. The pain continued for ten minutes, then let up for fifteen minutes. A hypodermic of morphin relieved the patient for three or four hours, then had to be repeated. On the second day a large mass could be felt at the right costal margin extending as far back as the right kidney area. We had difficulty in ruling out a kidney tumor and on this account the patient hesitated about undergoing operation.

On the third day the temperature was 99°, pulse 100, and leukocyte count 22,000. At this time the abdomen was opened under spinal anesthesia and a large, distended and necrotic gallbladder was revealed. The gallbladder was well packed off from the peritoneal cavity and removed, as in the former case. A small drain was inserted and the patient made a good recovery, was discharged from the hospital on the tenth day, and has been well since.

Case 4.—Mrs. J. K. L., aged fifty-three, had had her first attack of epigastric pain three weeks before operation. The pain was never severe enough to require morphin for relief. The patient continued to have epigastric distress and her symptoms remained about the same for two and one-half weeks, when suddenly the temperature rose to 103°, and the leukocyte count to 12,000.

The patient was taken to the hospital but her symptoms soon began to subside. Two days later her temperature reached normal and she was much better generally but could not eat and still complained of a lump in the epigastrium. A large mass could be palpated at the right costal margin. On opening the abdomen the gallbladder was found to be buried by a mass of adhesions and was exposed with much difficulty. This was the only case in the series in which a stone was not the obstructing body. Here the inflammatory process and torsion of the cystic duct caused the obstruction. The gallbladder was full of pus but no stones were found. A cholecystectomy was done. The patient made a good recovery and has been well since.

Case 5.—Mrs. J. D., aged forty-nine, had had her first attack of gallstone colic ten years before operation. She had had three more similar attacks previous to her final attack. All of the other attacks subsided

after short periods of pain and epigastric distress. In this final attack the pain and general symptoms gradually increased until the fifth day following the onset of the attack, when she came in for operation.

The abdomen was opened under spinal anesthesia. The gallbladder was covered by omentum and adherent to adjacent organs, and when separation of these was begun it was found to have perforated. Great care was taken to prevent contamination of the peritoneal cavity. The gallbladder was gangrenous and filled with pus and stones. The obstructing stone was in the pelvis of the gallbladder. Stones, pus, and portions of the necrotic gallbladder were wiped away and several drains were inserted. The patient made a fairly good recovery but drainage continued for about three months. At the end of that time the wound closed but had to be reopened two months later because of epigastric pain. Subsequently the wound was opened three times for the relief of pain, but has been closed now for six months.

Case 6.—Mr. A. H., aged forty-seven, had had no attacks of gallstone colic previous to the attack in which he was operated. Three days before the operation he was seized with sudden severe pain at the right costal margin. It required $\frac{3}{4}$ grain of morphin to relieve the pain. Morphine had to be repeated every two or three hours to make the pain bearable. On the third day the pain suddenly let up and the patient was quite comfortable for several hours. Soon the abdomen became distended and tympanitic. All the symptoms of a diffuse peritonitis were present. The patient appeared to be in shock; the pulse increased; there was a slight jaundice present; and attempts to evacuate the bowels were in vain. His temperature at this time was 100°, pulse 106, leukocyte count 22,000. It was at this time he was referred for operation.

Under spinal anesthesia the abdomen was opened. Bile stain was observed before the peritoneum was opened. The gallbladder had perforated and pus, bile and stones had been evacuated into the peritoneal cavity. The abdominal cavity was cleaned out as well as possible, a catheter inserted through the perforation of the gallbladder, several cigarette drains were placed outside the gallbladder, and the abdomen closed. The patient had a very stormy recovery and drained for several months, but is well today.

Case 7.—Mrs. B., aged seventy-seven, was operated upon elsewhere. Her attack of pain came on three weeks before the operation. The condition did not entirely clear up during this time and the patient was desperately sick at the time of operation. A cholecystotomy was done and the patient left the hospital in fair condition after three weeks but the wound drained for two months. Two or three weeks later the wound had to be reopened on account of severe pain. After draining several weeks, it closed again. In all, it had to be reopened nine times before it finally closed to remain closed. This was seven months after the date of operation.

Case 8.—Mrs. Mc., aged sixty-two, had never had a severe attack of gallstone colic before but did have digestive disturbances indicative of gallbladder disease. This severe attack came on three days before the end.

During the first few hours of the pain the patient had $\frac{1}{4}$ grain of morphin for relief of the pain. Soon the effects of this wore off and morphin had to be repeated. The severe pain was quite definitely located at the right costal margin and a definite mass could be palpated at this point. She also complained of a pain over the precordium. This somewhat confused the picture.

The patient was brought to the hospital for study. She had considerable morphin and vomited almost continuously and was so extremely sick that detailed study was difficult. On the third day of the attack we were just about ready to do an electrocardiogram when suddenly the patient collapsed and expired. The patient had come to the hospital twenty-four hours before the end, but fortunately operation was delayed. This patient had definite empyema of the gallbladder as well as an acute coronary thrombosis. Her temperature was 99.6°, pulse 106, and leukocyte count 20,000 on admittance to the hospital.

Case 9.—Mrs. P., aged sixty-eight, had had her first attack of gallstone colic eight years previous to the final attack. The attacks had been frequent since, with interval food distress and other symptoms of cholecystitis. We had considered operation several times before but the general condition of the patient was not good and she had definitely made up her mind that she would die if operated. This mental attitude of the patient was one of the principal factors for our delaying operation. During the final attack she was in the hospital several days. We were observing her, hoping the condition would subside.

On about the sixth day after the onset of the attack she suddenly showed signs of collapse and was taken to the operating room as soon as possible after the administration of hypodermic and intravenous stimulants. Her pulse was fairly good and after receiving the stimulants she seemed to be in fair condition for surgical drainage. The abdomen was injected with novocain and just as the abdomen was opened the patient expired. The gallbladder had ruptured and some of the contents had been evacuated into the peritoneal cavity.

I have given a brief history of only nine of the sixteen patients. The symptoms, surgical procedure, and ultimate results in the remaining seven were very similar to those of the first four above. All sixteen patients gave definite evidence of empyema of the gallbladder. In seven of these, gangrene was present to some degree. All but one had stones in the distal cystic duct or pelvis of the gallbladder, and had a leukocyte count above 12,000, many having been above 20,000. All had sustained pain and practically all had steadily increasing symptoms from the onset of the attack. Ten patients operated upon during the first three days of the attack showed the inflammatory process apparently confined to the gallbladder. In all of these ten patients the gallbladder was quite readily removed and contamination apparently avoided. All of these ten had a mild convalescence. All ten were discharged from the hospital in less than two weeks and none had drainage after that time.

In the remaining patients operated upon the inflammatory condition had spread into the neighboring tissues. Extensive adhesions had taken place and cholecystectomy was made very difficult or impossible. The morbidity and mortality was definitely increased in the delayed cases.

In a severe acute abdomen of this class it is not always easy to determine before exploration just what stage of gallbladder disease is present. If a definite diagnosis can be made in these cases, I believe that the earlier operation is resorted to the better and more permanent will be the result.

DISILLUSIONMENTS IN NASAL SURGERY*

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NOWHERE in the entire field of surgery, I believe, has poor practice been indulged more than in the nose.

For the pioneers in rhinology I have most profound respect and admiration. Like the frontiersmen of civilization, they blazed the trail for us who came after them. Into and through a new and unknown territory they led us by their

courage and zeal to our present-day knowledge and understanding, absorbing the shocks of new experiences and bearing the burden of responsibility for new and untried procedures as they pressed forward and on.

Modern rhinology, quite similarly to modern otology, gained added impetus largely through the brilliant work of one man, Zukerkandl, famous anatomist of Vienna, who gave the world such understanding of the accessory nasal sinuses

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as it never had before, and upon which Hijek builded, probably as much or more than others, modern clinical rhinology. Politzer, in his field, it has always seemed to me, almost singly and alone, created the science of modern otology, developing not only our present knowledge of its histology and physiology but its pathology and treatment as well.

As in all great human undertakings, pioneer projects have taken a tremendous toll in waste of resources; so, too, early rhinologic practice, in its rapid growth and spread, has left in its path what would appear in retrospect like little more than a trail of surgical vandalism. Prior, even, to the universal assault upon the nasal accessory sinuses, surgical activity in the nose by the early rhinologists included much that was unfortunate through reckless sacrifice of indispensable mucous surfaces, but nowhere reached its peak of misfortune until radical surgery upon the sinuses added tremendously to the increasing multitude of climatic invalids that were left in its wake. Like a challenge to the wisdom of the Creator, and unappreciative of the imperative and indispensable function of the nasal structures, turbinates were clipped clean, as if they were newly discovered foreign bodies, and septal spurs and irregularities, with all their irretrievable mucous tissues, were sheared off, leaving the subject incapable of self-adjustment and self-defense against the vicissitudes of atmospheric and climatic change. Without exaggeration I think we can say that many well-to-do patients of that time prolonged their lives only by going to warm climates during the winter, while those unable to do so in many instances had shortened lives as the result of consequent seasonal and climatic invalidism.

Proper appreciation of the importance of the function of the nose can best be kept in our minds by picturing the composite nasal structure as a heated vestibule, with thermostatic control, guarding the deeper respiratory tract, tempering, moistening and cleaning the inspired air that we breathe. The turbinates can be compared to the coils of a radiator in this vestibule, through which the air in passing is heated and from the moist surfaces of which the air is moistened and cleaned. In addition, the vascular tissue of the turbinates, capable of rapid engorgement and depletion, readily adjusts itself to meet the changing requirements of thermic fluctuation in our

environment. To a lesser degree, also, the composite structure of the nasal cavities is capable, through evaporation, of cooling inspired air that may be too warm. Nowhere else in the body, unless it be in the lungs, is there such an extent of surface area afforded in such a small space as in the nose and its accessory cavities. All this area is unquestionably provided in the animal economy for the purpose of multiplying the extent of mucous membrane, with its glandular secreting mechanism and its vascular, heat-radiating surfaces.

In considering the affections that form the greater part of nasal troubles in people of this geographic section or corresponding climate, I feel strongly that the one condition responsible more than all others is the unnatural atmospheric condition in which we live, resulting from our modern housing and heating arrangements. Living in an alternating temperature of seventy degrees or above indoors, and zero or below outdoors, as we do by going in and out many times a day, was never intended by Nature as an added task for the nasal thermic mechanism, marvelously capable though it be.

In its heroic attempt at readjustment, to keep pace with such violent fluctuation, alternating in engorgement and depletion, the vascular tissue of the nasal mucous membrane soon takes on the defensive change of hypertrophy. Hypertrophy, as we know, includes a fibrous infiltration which soon makes such tissue incapable of its normal function of shrinkage, and, as a result, obstructed noses soon lead to air-tight, unventilated and undrained accessory sinuses. Air-tight sinuses soon bring on negative pressure, and the tissue fluids seeping into them become an ideal culture medium for the usual inert bacteria of ordinary, inspired air. Suppuration of the cavity is the result and is unrelieved until ventilation and drainage are somehow provided.

Now we come to the treatment, and here is the pit into which many enthusiastic, well-meaning but poorly balanced rhinologists fall. They have forgotten one of the fundamental truths of pathology, and that is that hypertrophy and atrophy are one and the same process, of which hypertrophy is the first half and atrophy the last half. They forget, when looking at an over-roomy, atrophic nose, even though it has never been touched surgically, that at one time this same nose was an hypertrophic nose, crowded and ob-

structed until fateful, supervening atrophy came along.

Two additional elements further contributing to atrophy are also forgotten. First, tissues of specialized function are exceptionally vulnerable to traumatism and, second, the scar tissue following surgical procedures, added to the already present fibrous infiltration of hypertrophy, very much hastens and extends the degree of atrophy.

Cauterization by actual cautery is even more injurious than sharp dissection, and the atrophy following it is more far-reaching.

As a result of these inescapable processes, the enthusiastic operator finds only too soon that the roominess that he provided by his surgery has not only doubled but trebled in a comparatively short time. After it has gone its full limit, it may be many times what he originally intended.

This is the story, only too evident, that is told to us by looking into the noses of patients of the early rhinologists and, too, the patients of present-day operators who are too radical in their surgery.

If the above portrayal is what is to be seen in noses where surgery was confined to the turbinates, you can imagine the graveyard appearance of noses where, in addition, the ethmoids have been torn down and other sinuses laid open. Let us be thankful that the above, for the most part, is the picture of the past. While, happily, such extreme cases are seldom longer seen, yet to a lesser degree they are much too often still in evidence.

In hypertrophic noses just one-third of what appears mechanically necessary will prove sufficient as an end-result, and it is far safer to underdo surgical resection, with a subsequent small additional resection, than to lose something which is entirely irretrievable.

Operation upon the sinuses proper is, in my opinion and experience, tremendously overdone. In the large majority of cases topical treatment and minor adjustments of the structures in the nose proper will procure ventilation and drainage; and, after all, the normal amount of ventilation and drainage is the cardinal requirement of health for all sinuses.

Ventilation in excess of the normal is to be avoided. Too-open and over-free approach by way of the normal openings, or ostea, to the sinuses leads to easy invasion and infection, and such exposed sinuses seem to be the ones that

are affected over and over again upon the occurrence of the slightest coryza.

But beyond this, to lay the sinuses wide open by way of abnormal or newly made approaches is to yield and forfeit *oncé* and for all any possible chance of a return to a near-normally functioning nose. Of course, in some extreme, unyielding cases of chronic, profuse suppuration, abnormal openings seem justified and necessary in order to get the benefit of gravity and freedom of drainage, but unfortunately the result is seldom more than partial relief or little improvement.

Radical exenteration with vigorous curetting in an attempt to remove or destroy the lining mucous membrane is, I believe, not good surgery. A diseased mucous lining I feel sure is to be preferred to exposed bone, for, diseased as it may be, the lining membrane seems capable of standing between a pus-filled sinus and endogenous infection. Many competent, long-experienced and qualified authorities are definitely on record with the statement that in their opinion the nasal accessory sinuses are decidedly negligible as foci or depots of endogenous infection. It is admitted that outpouring of pus from chronic, suppurating sinuses into the pharynx and on into the alimentary canal is a menace and a potent cause of gastric, duodenal, gallbladder and appendiceal disease, but to assume that radical exenteration of these cavities is sure to end such suppuration is unwarranted optimism. Reinfection and relapses of these crippled structures over and over again is my experience and observation. For this reason I am convinced that radical exenteration brings us no better result as to its effect upon the suppuration than conservative measures, and has the disadvantage of further crippling the nose by sacrifice of mucous surfaces and their underlying nasal structures of heat-producing function.

The younger the patient the more far-reaching is the atrophy that follows trauma and surgical sacrifice in the nose. Therefore surgery of almost any extent in the noses of children is little short of catastrophe. Dean and, too, the St. Louis School were largely instrumental in initiating the surgical treatment of sinuses in children, in connection with focal-infection troubles. Some of our pediatrician friends, too, were not less enthusiastic during the spread and indulgence of this ill-considered bugaboo. Fortunately, like all excesses of unestablished merit and worth, its

value or justification is rapidly receding even in the minds of its proponents. To discount at least 50 per cent of all innovations in medicine and surgery is a good and safe rule, and this radical procedure is a most flagrant example.

The importance and hazards of disease processes in the different nasal sinuses vary greatly.

Acute or chronic disease of the frontal sinuses is by far, in my experience, the most hazardous of all sinus affections, and furnishes all the mortality I have had in nasal sinus cases. When an initially acute or an acute flare-up of a chronic frontal sinus presents itself, with all the outward signs at the brow and in the orbit, decidedly energetic action in opening through the brow is indicated without the added enlargement of the passage to the nose, where recurring granulations only tend to make that route of drainage worse than if left alone to regain its permeability after recession of the swelling. Erosion through the internal plate, with meningitis by extension, rapidly supervenes unless promptly relieved.

The ethmoids have long been the object of excessive, radical and poor surgery. Complete exenteration of the ethmoids is the quickest way I know of making a climatic invalid. Most men of mature judgment and experience have limited themselves to the snare and the biting forceps in doing as conservatively as possible what will sufficiently ventilate and drain the ethmoid cells.

The sphenoid as well as the posterior ethmoid cells are comparatively unknown land to most rhinologists as a result of the very unsatisfactory interpretation of symptoms of disease in these cells. Operations done on the sphenoid are mostly limited to enlarging the normal ostium on its face. But even this procedure is very much handicapped and at a tremendous cost through the necessity of sacrificing some or all of the middle turbinate in approaching the sphenoid field. Rapid granulation, however, here as in most such places of approach to the sinuses, very considerably nullifies our efforts.

The maxillary antrum, by far the most assaulted sinus in rhinology, seldom presents any serious or emergency necessity. The maxillary cells can continue for months, or even years, the site of suppurative accumulation without any considerable local or constitutional harm.

An acute congestion or even infection of the antrum, as well as any one or more of the other sinuses, is probably part of all acute, severe coryzas or severe infections of the nose, and so

long as ventilation and drainage are uninterrupted probably runs its course to recovery without any more unusual manifestation than the nose proper would show without a participating sinus. It is only when such interruption of ventilation and drainage occurs that we are confronted with the necessity of interference. By far the majority of such acute sinus involvements will progress to recovery by the mere shrinking of the mucous membrane in the region of the ostea. Often a mere boost to assist in regaining its balance as to ventilation and drainage will permit a nose to take care of itself. Surely shrinkage for a few days in succession is all that is necessary in the vast majority of cases.

Puncture into the antrum under the inferior turbinate, with irrigation, should not be done until it is evident that it is necessary, as manifested by little or no discharge in the presence of localized pain and feeling of pressure at the cheek. Many chronic antra have been started on their way by such unnecessary interference.

A chronic, suppurative antrum that is near to being a perpetual cesspool of putrefaction, however, is aided to decided improvement by making a moderate-sized window under the inferior turbinate through which, by gravity, this accumulation finds its way out, and through which irrigation occasionally can help to bring intervals of recovery. Intervals, I say, because practically all these artificially opened sinuses become reinfected with each cold or attack of coryza, and seem barely able to partially regain their freedom from discharge before they are again active. Discouraging, I should say, but nevertheless true. And right here I am willing to put myself on record as saying that this conservative window-making in the treatment of chronic antrum suppuration is the best that can be done for such cases. Any more radical procedure, in my experience and judgment, obtains no better result in the end and only adds to the invalidism of the patient by unnecessary sacrifice of defensive structures and tissues. I mean by this that radical exenteration of the antrum, including sharp curetting of the lining mucous membrane, breaks down an important barrier between suppuration and endogenous infection; in other words, creates an active focus of infection for endogenous distribution that according to the preponderance of opinion did not exist before.

The Caldwell-Luc operation in my opinion is

an extravagance in radicalism that should always have been challenged, except in the presence of major pathology (retained foreign bodies, dental cysts, tumor growth, etc.). Its advantage could only be in connection with better ability to exenterate the antrum, which I have previously condemned on account of the danger of increased endogenous infection. In addition, I cannot conceive of this approach to the antrum without the possibility of jeopardizing the apical dental nerves in the path of the resection, so close over the root-tips of at least two to three teeth. Devitalization of the neighboring teeth may be the price of this unnecessary procedure and surely cannot be ignored, especially in view of the fact that approach to the antrum can be fully and sufficiently made through the nose. Sensory disturbances of the cheek, too, as a result of injury to the infraorbital nerve may follow this procedure.

Up to this point we have confined our discussion to definitely infectious, suppurative, inflammatory affections in rhinology. Now we are to consider allergic, vasomotor and hyperplastic affections, and right here is the appropriate place in which to apply the subject of this paper, "Disillusionments in Nasal Surgery."

In my opinion, of all the affections and conditions in the human organism where surgery has been not only the least beneficial but, in addition, largely harmful, allergic, vasomotor and hyperplastic affections of the nose have been the most outstanding. Especially and positively is this so where, in these conditions, radical operations upon the sinuses in addition have been done.

I purposely mention together vasomotor and hyperplastic affections for the reason that their distinction and separation are not definitely established in my mind, and, too, because their association is so frequently present.

In approaching the consideration of vasomotor nasal affections, we come upon such an expanse of the unknown, or little known, and such a maze of biologic chemistry and anaphylaxis, with not only its phenomena of comparatively simple sensitization and desensitization but even fatal reactions, that we should pause and pause long. To assume that we are entirely safe in indulging unguardedly in surgery in the sphere of such potentialities is but taking chances. The possibilities of local surgical reaction upon patients in the anaphylactic state are tremendous, and could all such resulting fatalities have been

accurately recognized and connected with the precipitating local surgical element much greater danger would be evident. With a comprehensive view in mind of the possibilities of local nasal reactions in association with protein sensitization and other anaphylactic states, surgical procedures in such cases would be approached much more timidly and cautiously than they are.

The writings of one of our own members, Dr. Shannon, on the exudative diathesis and anaphylaxis, were far in advance of their time, brought more comment from far and wide probably than most of our home-written articles, and are now being substantiated in current literature.

The term allergy, of rather indifferent meaning and interest to us, rapidly assumes its role of importance to each man who has had a fatality or near-fatality charged to him as the result of anaphylaxis. The dermatologists, the internists and the pediatricians know well the dangers lurking in the wake of intravenous medication and the dermal and subdermal administration respectively of vaccines and serums.

And now it is for us to ponder upon the possibilities of allergy as the original, initial cause of the common cold, which subsequently, sooner or later, has superimposed upon it the infectious and suppurative character of the malady. Of course a chronically involved, suppurative nose might go on and on without at any time entirely ridding itself of the infection. In such cases each acute exacerbation ushered in with coryza-like symptoms might be charged to the anaphylactic state of the patient, and be the beginning, also, upon which each exacerbation of suppuration takes place. In the other hand, a nose affected for the first time, a nose of virgin soil, so to speak, would have its initial coryza directly and wholly as a result of an underlying anaphylactic state of the patient.

Much time and effort in research have been given to the determination of the cause or causes of the common cold. For the most part, however, this work has been directed to the bacteriological aspect of the subject, which, however, according to the above hypothesis, would be but the complication of and not the initial cause of this long-studied malady. Allergy initially may prove to be the answer.

Vasomotor rhinitis presents two commonly recognized types: (1) the distinctly seasonal type; (2) the perennial type.

The first, or seasonal, type is unquestionably

due largely to a specific irritant. The second, or perennial, type is due to nonspecific or manifold near-specific irritants. Dr. Shannon's proposal of the capabilities of nonspecific irritants in patients in the anaphylactic state would fully explain the causes of perennial vasomotor rhinitis and the local manifestation of violence due to a concentration of antigens at the point of any kind of specific or nonspecific irritation, including surgical trauma.

In many biochemic processes in the animal organism the balance of normalcy is easily upset by some apparently casual influence, but nowhere is there a hair-trigger-like control so susceptible as that upon a basis of anaphylaxis or allergy in the patient. Irritation is mild trauma, but trauma nevertheless, be it chemical, thermal, mechanical or surgical, and the existing precipitating trauma of a very far-reaching pathologic process may be but very superficially separated from its unsuspected latent basis. Arthritis, for example, and arthritic pathology may be held just in the balance of body chemistry until some most insignificant trauma unbalances the scales of control.

Taking the opportunity of going into the fascinating subject of allergy is not the purpose of this paper, but merely to lay a foundation for argument against surgical procedures in this type of case that are not only of no benefit but which are positively harmful in breaking down by trauma and crippling the already jeopardized balance of resistance in these structures.

The best chance that nasal structures have of reestablishing their normal physiologic function is by returning as near as possible to their normal anatomic state. Surely such sensitized structures as we find in a vasomotor affected nose have less chance of resuming their normal allergic balance and, too, of resisting superimposed infection and suppuration, in the presence of traumatized, fibrous, scar-infiltrated tissue and, in case of the sinuses, wide-open exposed cavities which were never intended to be exposed. Even in infected suppurating sinuses the minimum artificial opening and exposure of these cavities should be the last resort in securing the necessary ventilation and drainage. Vasomotor noses, in further argument, may exist indefinitely free of the added pathology of infected suppurating sinuses which to a major degree, in that condition, would be the only reason for artificially opening and exposing such cavities. Such infection and suppura-

tion in the sinus cavities of vasomotor noses may not take place until they are laid open and exposed.

Often, in these days of the sinusitis bugaboo, every symptom of heaviness, uneasiness and pain is taken for sinus infection when in reality many times, including even severe migraine attacks in patients of such predisposition, it is but due to the pressure of engorged turbinates or temporary ventilation inadequacy, without any suppuration, in these airtight cavities of such waterlogged noses.

To be sure, appropriate measures of treatment are to be striven for in the vasomotor or allergic type of nose trouble, but such measures are for the most part decidedly not surgical. The ideal treatment, of course, is by way of approaching and eliminating, if possible, the underlying allergic or anaphylactic basis, dietary and otherwise, and excluding so far as possible the exciting irritants, both specific and nonspecific.

Shrinkage of these noses with very weak (one per cent) cocaine solution, to which a few drops of adrenalin to the ounce are added, followed by liberal covering of the mucous surfaces with a spray of bland oil, is the best measure available for immediate relief. If continued use at home of this spray of bland oil is kept up for the purpose of protecting the nasal surfaces from continued irritants, really all that it is possible to accomplish has been done for the time and can be repeated for relief.

Each man, according to his experience, will endeavor to do the best he can to meet the acute condition that confronts him, but there are some cases that will not tolerate adrenalin, cases which apparently are made worse by the above-mentioned weak solution of cocaine and adrenalin. All, however, seem to tolerate the bland oil and are, at least in a measure, relieved by it.

Ephedrin, while a wonderfully efficient drug if used under the direct control of the rhinologist and for a short time only, is capable of more harm and longer lasting damage than any other drug in the rhinologist's armamentarium. Like aspirin, but much more harmful, ephedrin is is passed over the counter without limit to every person who asks for it and without a word of caution, either spoken or printed. As a result, many times its use is continued in quantity and frequency until the totally paralyzing effect to the vasoconstrictors of the nose is complete. Then we are in trouble, for, use what we may, until

the resulting vasomotor paralysis begins to pass off nothing is effective in shrinking the totally waterlogged nasal tissues, and the patient must go for days with a completely closed nose. The effect of the paralysis to the vasoconstrictors following ephedrin poisoning, it is said, takes several weeks to completely pass off. Some steps by the proper authorities should be taken to safeguard the public against the harmful effects of the uncontrolled and unrestricted use of this otherwise wonderful and useful drug, and physicians should be more circumspect than to prescribe it as indifferently as they do. Ephedrin, when it is employed, should be used cautiously, and but for a short time, as a spray to reach the upper half of the nose, not as "drops" which, running along the floor of the nose, affect only the lower parts of the inferior turbinates. It is the engorged inferior turbinates, in the state of vasomotor paralysis, that we most frequently see as the result of the overuse of "drops" so extensively prescribed, as well as sold without prescription.

In considering surgery in the nose as a whole, but not in any one type of nasal pathology, it surely has a place of importance in well-considered, guarded and conservative procedures, but certainly not often in major, radical and destructive sacrifice of mucous surfaces and their underlying framework, much too frequently indulged in in the past. Taking advantage of the opportunity for simple readjustment and correction of faultily placed nasal structures instead of resorting to extirpation, exenteration and resection, is the most beneficial practice in rhinology, for it must be most definitely kept in mind that in the nose especially a return to physiologic normalcy requires corresponding anatomic normalcy. In-fracture and out-fracture of misplaced turbinates, and the careful crushing of abnormally large turbinates with cautious avoidance of macerating the covering mucous membrane, are preferable in all comparison to the resection of these valuable and indispensable structures in the nose. The perfectly controlled cauterization of hypertrophied lower turbinates with trichloroacetic acid is much safer than the the seldom correctly estimated surgical resection. These and many other simple and conservative measures in the end accomplish more good than the more radical method.

The submucous resection of the septum prom-

ised for a time, without apparent qualification, to be the greatest boon in the hands of the rhinologist as a means of gaining room in crowded noses without the sacrifice of mucous surfaces or their underlying framework. And it really has solved this long-studied problem, but even this great improvement over old methods may have unfavorable consequences in a portion of cases where it is done.

In my own experience I have seen quite a number of noses develop most exaggerated vasomotor qualities following the submucous septum operation without having had any suggestion of such a tendency before. This, of course, can be explained by our theory of a precipitating irritation (in this instance, surgical trauma) in the nose of a patient with an underlying allergic or anaphylactic basis. As a result of this experience my enthusiasm for this procedure has been held in abeyance and has considerably cooled for the reason that these patients, even though they had decided bony obstructions previously, became much worse off after the septum operation than they were before.

Fortunately this unfavorable change does not happen frequently, and the septum operation still remains most decidedly the best of all procedures for the purpose of gaining room where it is necessary for ventilation and drainage of the sinuses, which latter condition is the cardinal requirement for the normal health of these cavities.

I think that the idea is altogether too prevalent among the profession that perfectly executed operations of standard prescribed procedures upon the sinus are all that is necessary to relieve these troubles, when in reality it is but a minor part of the problem of getting these cavities back to their normal physiologic state after being subjected not only to infection, but also to added surgical trauma and changed anatomical relationship.

If it could be assumed and were true that all well-executed surgical jobs in the nose yielded good end-results in the form of restored, normally functioning noses, rhinological surgery would be a delight, but the restoration of normal function is something we cannot deliver in extensively operated noses; and the whole question, summed up, resolves itself into this proposition: Postoperative physiologic restoration is in direct ratio to postoperative anatomic restoration.

THE TREATMENT OF BURNS*

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THE first consideration in the treatment of any burn is the preservation of the patient's life, when life is threatened by shock, toxemia or blood concentration; the second is to so treat the wound that healing will be completed in the shortest space of time consistent with the first consideration; and then, reconstruction. They are of importance in the order named.

For years the only classification of burns used in this country was based on the depth of the burn: first degree, erythema; second degree, vesicle formation; and third degree, the partial or complete involvement of the skin and underlying structures. Now we consider also the extent of the burn. Burns of the first degree are usually fatal⁶ if two-thirds of the body surface is involved, while if one-third of the body surface in adults, and one-seventh in children, is involved in a second degree burn, a fatality usually results. It is therefore desirable to classify burns both by the depth and the amount of body surface involved, as a 25 per cent first degree burn, a 10 per cent second degree burn, etc. The estimation of the extent of body surface involved can be based on Berkow's work,³ who showed that the lower extremities, including the buttocks, comprise 38 per cent of the body surface; the trunk, including the neck, 38 per cent, the upper extremities 18 per cent, and the head 6 per cent. The hand is one quarter of the upper extremity, the foot is one-sixth, the leg one-third, and the thigh one-half. This area determination of the extent of burns does not apply so well for children, as a burn comprising a certain body area is much more serious in a child than a corresponding area in an adult.

The immediate result of a burn is the initial shock; then follows toxemia, which is probably not produced by the absorption of a soluble substance developed in the burning of living tissue, but more probably is produced, as Underhill and his co-workers have shown,⁹ by excessive concentration of the blood in the person injured.

The initial shock in any seriously burned patient is closely similar to any surgical shock, with the fortunate blunted sensibility, cold moist skin, subnormal temperature, rapid pulse and lowered blood pressure. The important consideration at this stage is not the degree of the burn but the degree of shock present. Morphine is given to control pain, external heat is applied, fluids are given by whatever methods are practical, and great care is taken in the removal of any clothing. When the patient's condition warrants it, treatment of the burn can be started.

Few contributions to the therapy of burns have been as epoch making as Davidson's⁴ tannic acid treatment. Davidson first used moist compresses of a 2.5 per cent tannic acid solution applied over the burned area, and kept moist until the area was thoroughly tanned. A short time later, Beck and Powers¹ advocated the use of a spray, which has become generally adopted. However, as most burns are emergencies in industrial work, preparation is made for their immediate treatment preceding hospital care. Clean sterilized quart Mason jars with one ounce of powdered tannic acid in each are kept readily accessible. A large printed sign above these jars and a smaller sign on each jar, advises to fill the jar two-thirds full of clear water, shake and then apply freely to the burned area. The tannic acid dissolves readily in water and there is no delay. Large squares of gauze are laid over the exposed areas, are thoroughly saturated, the patient is covered with two blankets and sent immediately to the hospital. No attempt is ever made to remove any clothing involved in the burned area until the patient is seen at the hospital.

Patients coming from homes or from places where no first aid care is given, almost invariably, it seems to me, are covered with some ointment or grease. Carron oil and heavy lubricating oils seem to be the chief offenders. Needless to say this must all be removed before any tannic acid treatment can be instituted, and it always seems a tedious task to the surgeon, and always a painful one to the patient, especially when sol-

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vents are necessary. An anesthetic may be required.

The hospital treatment is well known to you all. The removal of dead skin; the use of the spray; the cradle and the external heat; the prevention of circulating air around the wound; and the warmth of the patient's room. The only possible item of interest here that I might add is that after experimenting with several types of imposing spraying machines we have descended to the use of the hand pump spray manufactured by the makers of liquid insecticides. It has the unique virtue of being both cheap and efficient.

Coincident with the institution of treatment of the burn itself, is the institution of measures to lessen the dehydration of the body. Blood transfusions may occasionally be deemed advisable, though some surgeons use them routinely in all severe cases. Fluids, particularly normal sodium chloride solutions, are almost invariably indicated in amount from five to eight liters in twenty-four hours. Beckman² has laid down a rule of one liter for each twenty-five pounds of the body weight every twenty-four hours. This replacement of fluid to the body is essential, as it has been proven that there is a water loss from the blood stream amounting to as much as 70% of the total volume of blood following burns. Davidson¹⁰ and Mathew⁵ explain the resulting blood concentration by assuming an early increased permeability of the capillaries. This increased permeability is effective in only one direction, as reabsorption in the burned area is very meager for some time following a burn.

Too high a concentration of the blood is incompatible with life. Pack⁸ writing in elaboration of his work with Underhill⁹ states that an increase of 40 per cent in hemoglobin for a short period only will cause death, while an increase of 25 per cent places the patient in a critical condition. The persistent increased concentration of blood results in the phenomena of failing circulation, oxygen starvation of tissue, oliguria and death.

The determination of the hemoglobin content of the blood is therefore important as a guide for the amount of fluid and salt necessary to reestablish normal fluid balance in the body. Fluid replacement is hastened by the use of intravenous saline solutions, and rendered more lasting by the use of either blood transfusions or solutions of acacia, which has the property of holding the

water within the body. In the use of the latter, it is preferable to use normal saline both before and after.

The oliguria, when present, can hardly be classed as a true nephritis, as it is not usual to find at post-mortem examination of patients dying from burns, uncomplicated with sepsis, any pathological changes in the kidney. The oliguria is probably due also to the increased concentration of the blood, and the inability of the kidneys to take care of the abnormal blood furnished to them. The blood concentration also readily explains the higher urea findings, irrespective of any nephritis.

Tetanus antitoxin should be used in all cases. While it has been maintained that most of the recorded cases of tetanus following burns are in reality due to edema of the brain or thrombosis, I would prefer personally to be guilty of having given antitoxin, than to be conscious that I have failed to give it should "edema of the brain or thrombosis" develop.

The tannic acid treatment of burns is also an important factor in the equalization of body fluids, as its early use reduces the loss of water from the burned area. Usually after six or eight hours a crust is formed over the burned area, and within twenty-four hours this crust is well established, thereby effectively lessening the permeability of the capillaries. If no infection develops, this crust is not removed until it loosens; the crusts curl up around the margins and are daily trimmed off. If infection should develop around or beneath the crusts, they are softened with Dakin's solution and removed, and routine Dakin's treatment of the wound is instituted. Montgomery⁷ warns against the use of boric acid dressings in the treatment of burns at this stage, stating that "a rapid toxemia develops which is frequently fatal."

After all the crusts from the tannic acid treatment have been removed, oxyquinoline sulphate combined with scarlet R, and a small amount of chloretone for its anesthetic action, is applied as an ointment to the new epithelium. Later, if necessary, skin grafts are applied.

The third phase of the treatment of burns, or the reconstruction of scars and contractures arising from them, involves the whole subject of plastic surgery. A simple skin graft only, or a most extensive reconstructive process may be re-

quired. It is neither the intent nor scope of this paper to enter this phase of the subject.

In conclusion, the first consideration in the treatment of the severely burned patient is the preservation of life. The tannic acid treatment, with its resulting diminution of loss of body fluids, its relief to the patient and its satisfactory end-results, is almost universally accepted. The prevention of shock to the patient, the constant determination of hemoglobin content to check the concentration of the blood, the restoration of the body fluid level, reestablishing the normal blood chlorides, are as equally important as the actual treatment of the burn.

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GUNSHOT WOUNDS OF THE ABDOMEN*

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AS SOCIAL conditions change, physicians are called upon to meet changes in their practices. With the hunting hysteria brought on by the opening of the short pheasant and duck season, many individuals having little or no experience with firearms are turned loose in our fields as a menace to themselves and others. Later in the season the northern part of the State is covered with hunters who are armed with high powered rifles. These individuals often little realize the distance a bullet may carry and prove fatal. These facts, accompanied by a certain amount of buck fever, throw many into a state of incompetence. The above two hazards are more or less seasonal.

The increasing prevalence of the gangster and his unexpected appearance in almost any village or hamlet make it not at all unlikely for a physician in even the most isolated village to be called upon to care for a gunshot wound.

It is because of the above that it seems to me desirable at this time to present this subject. I am particularly interested in presenting the subject of gunshot wounds of the abdomen.

Keen¹ states that wounds of the small intestines are more serious than those of the stomach. In the Civil War all died. At San Diego four soldiers were operated upon for abdominal injuries and all died. In the Boer War 62 per cent died. At the University Hospital of Baltimore, out of twenty-three cases reported the mortality was 56 per cent. During the World War much improvement was shown in the mortality from all wounds except those of the abdomen.² Death most frequently comes from shock and hemorrhage; later from peritonitis.³ The prognosis of stab wounds of the abdomen is much more favorable than that from gunshot wounds.

The location and amount of damage done by a bullet is so varied that simple inspection of the wound gives but very little reliable information. A bullet may go through the abdomen without penetrating the peritoneal cavity. Webb⁵ reports

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a case of gunshot wound of the abdomen in which the bladder was punctured anteriorly, permitting the escape of urine from the entrance wound, and fecal matter posteriorly through a sacral wound. On opening the abdomen it was found that the bullet had not entered the peritoneal cavity at all. Later I shall report a case in which a bullet entered the back at the fourth lumbar vertebra, came out two inches above the ensiform, and did not enter the abdominal cavity.

Vale³ reports a case of a man shot by a bandit through the abdomen from side to side at the level of the umbilicus. The bullet passed between the coils of the intestines, only slightly injuring the mesentery.

Bottomley⁴ states that there is no sign or combination of signs sufficiently constant to serve as a basis for diagnosis or treatment. The time for relief from operation is usually past when a positive clinical diagnosis of visceral injury can be made. The rigidity is not so marked as it is following perforated ulcers, although there is usually a marked amount of shock. While the abdomen does not seem to tell much of the story, the facies give a picture of one who is in a serious condition, similar to that of an advanced general peritonitis. There is rarely any question as to the entrance or exit of the bullet.

When confronted with an abdominal gunshot wound the first thought that presents itself to the physician should be whether or not the missile has penetrated the abdominal cavity. Of course if it is palpable in the abdominal wall the expectancy treatment is the only one to follow. If it cannot readily be located, it is advisable to take antero-posterior and lateral x-rays. If the bullet is then located, and it can be satisfactorily demonstrated that the peritoneal cavity has not been penetrated, the abdomen should not be opened. The bullet wound may be debrided and its course determined, and then closed tightly. However, if there is the slightest question as to the probability of its having perforated the peritoneal cavity, the surgeon, in view of the slight mortality from laparotomy, is justified in making a careful inspection of the abdominal contents.

When the surgeon has decided to open the abdomen he should keep before his mind the fact that patients do not die from penetrating wounds themselves, but lose their lives from shock, hemorrhage, or infection.⁴ Transfusion and intra-

venous or subcutaneous administration of fluid or nourishment, if used within a reasonable time after the injury, should save most patients from the effect of hemorrhage.

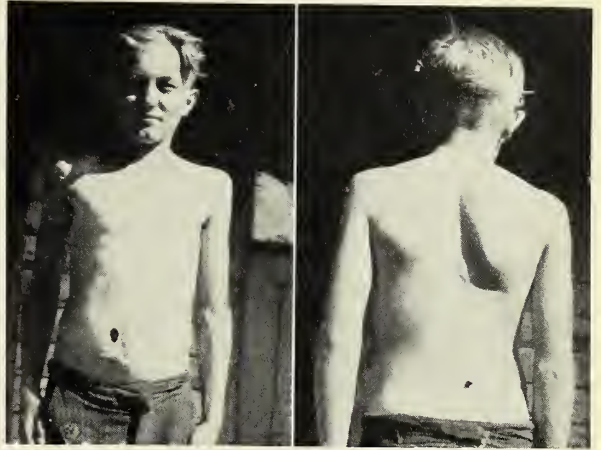


Fig. 1 (left). Case 2. Note entrance of bullet.

Fig. 2 (right). Case 2. Note exit of bullet.

The operative incision is usually in the mid-line, should be large, and operation should be carried on with as much rapidity as can be done with safety. On opening the abdomen the first thought should be to ascertain the amount of hemorrhage and to control it. Then the larger viscera in the region of the wound should be carefully inspected and all portions of the large bowel. The small bowel on account of its motility should be examined in its entirety, passing it from one hand to the other until it has all been inspected.

If after controlling all bleeding and repairing all injuries there is any difficulty experienced in returning the coils of the bowels that may be outside of the abdominal wound, they can usually be easily replaced by grasping the wound on either side with the hands, and raising the abdominal wall rather suddenly. The inrush of air will usually carry the bowels in with it, thus avoiding possible injury to the bowels by an attempted manual reduction. The viscera should be replaced in their anatomical positions as nearly as possible. The omentum should be brought down to cover the bowels.

The question of drainage is one largely dependent on the individual surgeon's experience. Drainage of the entire abdominal cavity is impossible. No single drain will drain more than a few hours before it is walled off. Accumulations may occur in the pelvis and a drain may be

inserted there. Also accumulations may occur in the flanks and may be drained. The peritoneum will quickly wall off some contaminations. Early operation and minimal drainage is most desirable.

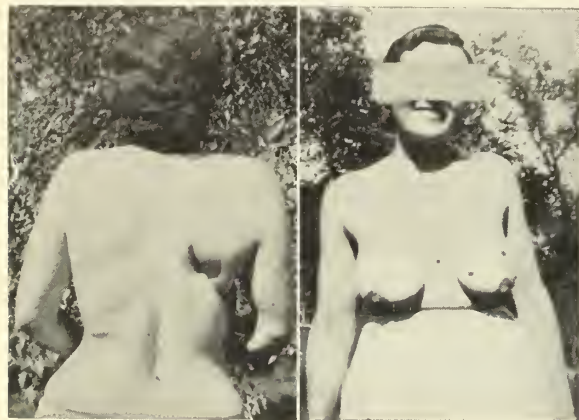


Fig. 3 (left). Case 3. Note entrance of bullet at fourth lumbar vertebra.

Fig. 4 (right). Case 3. Note entrance and exit of bullet through the breast, also exit of another bullet which entered from the rear 1.5 inches above the ensiform cartilage.

The later the operation the more drains are required and the greater the mortality.

Wounds of the small bowel cause less contamination than those of jejunum or stomach. Possibly all stomach and jejunum wounds should be drained; the drainage of others will depend on the amount of soiling of the peritoneum. The infection can be very materially reduced by a careful toilet of the abdomen, which should include suction.

After-treatment should consist of the giving of antitetanic serum in all gunshot wounds, in any part of the body. Because of this preventative treatment, tetanus has been reduced from 71 to 0 per cent. Before giving the serum it is well to ascertain if the patient has had diphtheria, has been given any other serum, has asthma, or is susceptible to horse dander. If in doubt, the serum should be diluted one to two hundred and one or two drops injected into the skin. If no reaction occurs, larger and more concentrated amounts may be used until the full dose is tolerated.

The patient should be put in Fowler's position, at least 3,000 c.c. of fluids given every twenty-four hours by hypodermoclysis or by vein, fluids by mouth being withheld until the probability of the development of peritonitis is past.⁴ Morphine should be used very freely to relieve restlessness and pain. It may be pushed until

respiration drops to eight or ten per minute and may be continued for as long as seventy-two hours.

If ileus occurs it should be treated with the Levin nasal tube and suction, which usually gives quite prompt relief. When the large bowel or the ileum is involved, an enterostomy is also very helpful. This is a simple procedure which may be of considerable help postoperatively. A stab wound is made through the left rectus region and a catheter is passed through the stab wound into the abdomen. The omentum is grasped and the catheter passed through it. The small intestine above the involved area is grasped and a small pursestring suture is placed in the wall. An opening is made in the center of the pursestring and the catheter is passed into the lumen of the intestine for about six inches and the pursestring is drawn tight. The catheter is buried in the wall of the intestine for two or three inches by a continuous Lembert suture. This procedure puts the involved bowel below at rest and the catheter is removed as soon as the abdominal symptoms have subsided, which usually occurs after four to six days. Passing the catheter through the omentum minimizes the danger of the small intestine becoming fixed to the abdominal wall.

I wish to report three cases which illustrate three types of gunshot wounds of the abdomen: (1) that involving a large amount of abdominal tissue loss; (2) that in which there is a single missile, with perforation of one or several of the abdominal contents; (3) that where many shot enter the abdomen with perforations somewhat widely separated from each other.

Case 1.—Extensive loss of abdominal tissue. B. C., twenty years of age, was riding when his shotgun discharged, entering his abdomen in the midline about two inches below the ensiform cartilage, cutting the seventh and eighth costal cartilage and the ribs at the anterior axillary line, carrying away a portion of the left lobe of the liver and also the upper portion of the spleen. He was picked up, carried to a farmhouse and was seen by the aid of a kerosene lamp. He was in moderately severe shock. On loosening his underwear the stomach protruded through the abdominal wall similar to the presenting of the head over the perineum. The two cut portions of ribs lay loose in the flesh and came out during the manipulation. The anterior wall was sutured around the margin and packed with gauze. The hemorrhage of the liver was controlled with a firm pack, as was the oozing from the spleen. The pack was not removed for two days and the wound was repacked until it healed. On account of the large amount of

abdominal wall destroyed, it was impossible to approximate the remaining parts. He recovered with a rather large hernia which has caused him considerable inconvenience since.

bled rather freely through the drains for two hours. He was given glucose, antitetanic serum; and made an uneventful recovery.

Case 3.—Only apparent penetration of the peritoneal



Fig. 5. Case 4. Shotgun wound of the abdomen.

Case 2.—Abdominal wound from a single missile. L. W., aged 11, was playing Indian with his older brother. As he crept up a dry creek bed, his brother, about 300 feet from him, called a halt and in true frontier fashion fired a .22 rifle at him. The bullet entered the abdomen about two inches to the right of and above the umbilicus. He was seen about one hour afterwards. Omentum was protruding about one and a half inches from the wound and he was in severe shock.

He was taken to the hospital, given stimulation, and saline subcutaneously. Laparotomy was performed and a large amount of free blood was mopped out. The injury to the mesentery was repaired and the hemorrhage controlled. There were three holes in the small bowel, two in the cecum, and two in the colon at the junction of the ascending and transverse colon. It was at this last point that the severe bleeding had occurred in the mesentery. As he complained of pain in the back before operation, careful inspection was made. The bullet was palpable in the lumbar muscles. Incision was made and the bullet recovered. Drains were put into the pelvis, and one up towards the hepatic area. He



Fig. 6. Case 4. Roentgenogram showing shot remaining after recovery. Note shot in the gallbladder.

cavity. F. A., a woman, 35 years of age, was shot in the left breast with a 32. The bullet glanced from the ribs and emerged from the lateral portion of the breast. She was then shot in the third lumbar vertebra a trifle to the right side of the spinal process. This bullet came out about one and a half inches above the ensiform cartilage. She was brought to the hospital an hour and a half later, unconscious, and in profound shock. X-ray showed free blood in the right pleural cavity. An exploratory laparotomy was deferred on account of the very severe shock and an uncontrollable hemorrhage in the chest. Paralysis was almost complete below the point of entrance of the bullet. She was given stimulation, antitetanic serum, heat and other appropriate measures, and gradually overcame the shock. After a long and very stormy course, which included gangrene of a portion of the right lung and a thorcoplasty of the right side, she now walks with difficulty, having little or no strength in the left foot. It would seem almost impossible that this bullet could have gone almost lengthwise of the abdomen without doing any serious damage and missing the important abdominal organs.

Case 4.—Wound in which many shot enter the abdomen. O. H., eleven years old, pulled a 20 gauge shotgun through the fence behind him. The gun discharged, striking him in the palm of the right hand, cutting away a portion of the palm down to the palmar fascia in the

wrist, the major portion of the shot striking him in the lower right quadrant of the abdomen. He was brought to the hospital in severe shock with thirty-four holes in the abdominal wall.

On opening the abdomen I found a large amount of free blood mixed with intestinal contents. There were forty-six holes found in the small bowels. These were distributed quite generally although in places they were not far apart. An attempt was made to close with pursestring sutures. This caused so much distortion of the bowel that it had to be abandoned. I then used Halsted mattress sutures, bringing one end back under the transverse portion and back to its original position. When this was tied it gave a firm closure with little anatomical distortion. Shot could be felt in the bowels and later when his bowels moved, he passed some shot. After careful toilet of the abdominal cavity, rubber drains were inserted up to the hepatic area and another back of the bladder into the pelvis. No fluids were given by mouth but they were pushed to the limit intravenously and subcutaneously. He made an uneventful recovery. The x-ray shows that he has twenty-three shot in his body, one of them being in the gallbladder, two in the pelvis, and one or two in the thigh.

Conclusions

1. Gunshot wounds of the abdomen should be treated immediately or not at all.
2. Shock and hemorrhage should be controlled at the earliest possible moment.
3. Routine inspection and palpation of each organ in the abdomen should be carefully carried out.
4. Treatment should be carried out in the assumption that peritonitis is present, as this is the only way mortality will be lowered.
5. Tetanus vaccine should be given in all cases of gunshot wounds.

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COMMON EYE INJURIES*

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OCULAR injuries are extremely important and well deserve a place on your nicely balanced program. It is unquestionably true that industrial eye injuries are less frequent now than a few years ago because of the safeguards developed to protect the eyes of workmen. On the other hand, injuries due to automobile accidents have increased steadily. Add to these the injuries received in childhood play and in the world of sport and we have a large number of cases of various degrees of seriousness.

An enumeration of some of the injuries we have seen may not be amiss. There were several lid injuries from glass cuts, mostly from automobile accidents. Foreign bodies in the cornea were by far the most frequent injuries seen. Lacerations and perforating injuries to the globe were caused by windshield glass, an explosion of a partly filled water bottle in a bonfire, a child's celluloid toy, a nail which was being removed

from old lumber, a bit of wire in a barnyard, a fall on a broken glass tumbler, scissors and knife blades, sled-runner, wooden sword, a blow from a whiplash, and from snapping back of a small branch of a tree.

Penetration of the eyeball by foreign bodies has been mostly from small particles of metal, usually steel, in workmen who were striking steel with steel. Two have been from explosion of dynamite caps. Foreign bodies in the orbit have consisted of wood splinters in a small boy who died from meningitis, B-B shot and 22 caliber bullets.

Injuries to the lids are important both from a cosmetic and functional standpoint. If they are longitudinal and superficial, healing takes place nicely with little danger of deformity; if through the entire thickness of the lid, care must be exercised in suturing in such a way that there is no inversion or eversion of the lid. If the levator tendon of the lid has been divided, it is necessary to bring the ends together. In one of our cases

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the upper lid was practically torn loose in its entire length in an automobile accident, but with careful suturing it was restored to almost perfect function. If the wound is vertical and extends through the lid margin, there is a gaping of the edges. The skin must be sewed carefully with silk or dermal, but in addition stay sutures which are placed more deeply, even through the lid, at some distance from the wound, are necessary to combat the tension arising from swelling of the lid. If there is loss of substance in a tearing or contusion wound, it may be necessary to make a sliding flap or a skin graft. Fortunately the lid is richly supplied with blood, and infections are not common. One must not forget, however, the danger of tetanus in these wounds and forestall its development with antitetanic serum.

Whenever there has been penetration of the lid or a conjunctival wound, one should be very careful that there is no foreign body in the orbital tissues. This is true of wood splinters, glass, metal particles, stone and many other substances. Limitation of movement or fixation of the globe, with or without pain on movement, should call attention to foreign material in the orbit. The little boy mentioned previously developed an orbital abscess from a retained splinter of wood, later dying of meningitis. All the conditions spoken of were present here, but apparently his physician had not recognized the fact that the foreign body was present. Foreign material such as small shot, bullets, small iron bits, copper or stone may often be left in the orbit and produce no reaction. They usually become encapsulated rather quickly and rendered inert. X-rays should be taken where there is the slightest question and the presence or absence of foreign material determined. It is then a question of judgment whether or not an attempt should be made at removal. If in such location that there is little disturbance to the important structures of the eye, I think they should be removed. If there is danger of severe injury in the removal and the material is such that we may expect more than an even chance that no ill effects will ensue, I feel that they are better left alone. From the tragic ending of the one case with wood in the orbit and from cases cited in literature, I do not feel that way about this particular substance.

Injuries to the cornea may be anything from a simple abrasion or erosion from small foreign bodies under the lid or from inverted eye-lashes, from fingernail scratches, twigs, edges of paper,

curling irons and a host of other objects, to lacerating wounds which may or may not perforate the cornea, and ruptures.

The most frequent corneal involvement is perhaps from foreign bodies, more or less imbedded in the corneal tissues, sometimes so small that they are difficult to find with the naked eye. For removal of all foreign bodies in the cornea a loupe should be used for magnification. Often enough patients come for relief from "conjunctivitis," or because they feel sure they have something in an eye which they have been told by their physician is not present. Many of them do have foreign bodies or breaks in the corneal tissue with a ring of rust or some other staining material which gives them the foreign body feeling. A very great help is the use of the stain, fluorescein in 2 per cent solution with 2 per cent sodium bicarbonate. If there is any break in the corneal epithelium there will be a vivid green staining with this substance. The ophthalmoscope may also show a dark area or spot in case of an abrasion or foreign body, when one searches from different angles against the background of the fundus.

For the removal of foreign bodies from the cornea, a local anesthetic should be used even in the simpler cases, to prevent undue damage to the cornea from movements of the eye. The commoner solutions used for local anesthesia of the cornea are butyn 2 per cent, cocaine 4 or 5 per cent, holocaine 1 per cent, alypin 2 per cent and pantocain 0.5 per cent.

Cocaine has the disadvantage of producing a dryness of the cornea and sometimes a sloughing of the epithelium as well as a dilation of the pupil, and I rarely use it for foreign body work. Butyn gives a very satisfactory anesthesia without these disadvantages.

For the removal of very superficial bodies a small tightly wound cotton applicator moistened with boric acid solution is sufficient and should be used in all cases which seem suitable. If there is stain left behind or if the foreign body is more deeply imbedded, a sharp spud should be used and every vestige of discoloration in the cornea removed. Many of the spuds made for this purpose, I feel, have too broad a point, causing an unnecessary disturbance to the surrounding tissue. My own choice is an old cataract knife with a fairly fine point. By having the patient fix his gaze on a given point, except in rare instances of young children or highly nervous individuals, only

a very small area of the cornea is then disturbed.

It hardly seems necessary to say that a measure of asepsis is necessary in the treatment of these cases. In the after-treatment there may be a temptation to do too much with antiseptic solutions and drops. If there is not already infection present, nature is kind and supplies tears, which are very effective as cleansing agents. This action of the tears is more than the mere mechanical flushing of the eye. Fleming (1922) described an enzyme found in small quantities in all animal tissues and in most body secretions, which he called lysozyme. Ridley identified this enzyme in the tears in 1928. The concentration in the tear fluid is one of the highest found in the body. When this concentration is normal, staphylococci, streptococci, gonococci and meningococci are readily killed. This action is lessened when there is excessive tearing, probably the result of dilution. It has also been shown that some of our favorite antiseptics destroy its action. In most cases the eye should be covered until the surface has been restored. If antiseptics are necessary, metaphen (1-2500) or mercurochrome (2 per cent) may be instilled or bichloride ointment used. If there is much irritation, particularly if the foreign body has been present for some time, it is well to dilate the pupil with atropine in the form of drops or ointment to put the eye more completely at rest.

If the wound is infected, corneal ulcer, iridocyclitis or even panophthalmitis may develop. Treatment of these conditions cannot be covered in the short time we have for this discussion.

Perforating wounds of the cornea, corneoscleral region and sclera give much concern. There is usually some prolapse of the iris as the aqueous escapes. If the penetration is through the depth of the anterior chamber there is injury to the lens capsule or lens substance with the formation of traumatic cataract. If infection is carried into the eye we again may have varying degrees of inflammatory reaction, even a severe panophthalmitis. Escape of vitreous humor causes a varying degree of collapse of the eyeball.

In absence of infection, wounds of the cornea alone are usually not serious problems. In small puncture wounds, the iris may be washed up to the posterior surface of the cornea and become attached, sealing the opening, and causing a misshapen pupil as the iris is drawn toward the wound. With longer wounds the iris is prolapsed and appears in the wound. When the injury ex-

tends through from the cornea to the sclera the ciliary body is injured. It is these cases that cause us most concern, because they are the ones in which sympathetic ophthalmitis may develop.

After 350 years, during which time sympathetic ophthalmia has been recognized, we are still at a loss to know just why it occurs. We know that the infection is in the uveal tract and follows injury, but how it occurs in the second eye, after injury to the first, is still unknown.

Some of the largest verdicts given in malpractice suits have been in cases of sympathetic ophthalmia. The patient or some member of the family should be told of the possibility of this complication in any severe eye injury and should take some share of responsibility. It is wise also to have consultation when the question of enucleation arises. When an eye is hopelessly mutilated and no hope of any useful vision exists, there can be little question of the wisdom of early enucleation.

Sympathetic ophthalmitis does not always appear soon after injury, but may come years afterward. A small foreign body may penetrate the eye and be present for years. Thus where there is the slightest possibility of a penetrating foreign body, x-rays should be taken. One must not depend on a patient's statement that no foreign body could have entered the eye. If a foreign body is found to be present, every effort should be made to remove it. It is a comparatively simple matter to remove a foreign body consisting of steel with a magnet, providing it is not tiny or that it has not been present long enough to have become fixed by organization of tissue around it. If non-magnetic, the globe may be opened and removal attempted with forceps. This is often next to impossible without so much damage to the intraocular structures that no good can be accomplished.

While it is a grave responsibility in some cases to leave an injured eye in place, it is also a great responsibility to advise its removal. Maitland, in the *Annals of Ophthalmology*, January, 1904, gave the following rules, which I think are sound:

1. Enucleate at once when the injury is so severe that the exciting eye is destroyed hopelessly from the beginning.
2. Enucleate at once on the slightest sign of sympathetic irritation should the vision of the exciting eye only equal a perception of light and darkness.
3. Enucleate at once if a foreign body is present in, and cannot be removed from, the exciting eye.
4. Enucleate at once when an injured eye is blind

and suffering from recurrent attacks of acute inflammation, or when it is tender and irritable as a result of the onset of degenerative changes, *e.g.*, ossification of the chorioid.

5. Do NOT enucleate when there is still sight in the injured eye, and when there is no sign of sympathetic disturbance in its fellow.

6. Do NOT enucleate when sympathetic inflammation is in progress and there is still sight in the injured eye, for under these circumstances the removal of the "exciter" will have no beneficial influence and the probability is that in the end all the sight the patient will possess will be in the primarily injured eye.

You will note that enucleation is the only procedure spoken of in these rules. Evisceration, with or without implantation of balls of glass, gold or bone or masses of fat should not be considered when there is danger of sympathetic ophthalmitis or where sympathetic irritation is already present.

If enucleation is not done soon after injury, some form of foreign protein therapy should be used in most cases. For this purpose, whole milk and typhoid vaccine seem to give the best reactions. We are for the most part using typhoid vaccine, intravenously, giving as an initial dose 20 to 30 million organisms in adults, with correspondingly smaller amounts for children. Infants are never given the vaccine.

In accidents where the iris is prolapsed, it is drawn out slightly further and excised, after cleansing the eye. An effort should then be made to replace the iris through the wound with a small spatula, such as that used for the same purpose following cataract extraction. Some

ophthalmologists make it a practice to touch the prolapsed portion of the iris with the electrocautery. In most cases, atropine should be used. With marginal wounds, it has always been advocated to use eserine to draw the iris away from the wound, and this may be tried, though it is rarely effective, and should be followed by atropine to put the eye at rest as completely as possible.

In the more extensive wounds, a sliding flap of conjunctiva, such as the Kuhnt flap, should be made to completely cover the opening in the cornea. It is rarely necessary to suture the cornea itself, though this may be done satisfactorily. Care must be exercised in doing this, as well as in suturing the sclera. Exerting pressure in setting sutures in the dense tissues of the cornea or sclera obviously would cause vitreous prolapse and defeat our efforts to get as nearly normal an eyeball as possible. When the eye is relatively soft, even with gaping scleral wounds, approximation of the edges may be obtained without direct suturing of the sclera, by overlapping conjunctival flaps, using mattress sutures. It would seem that, where there is such an extensive gaping that corneal or scleral sutures are necessary, the eye is usually lost and enucleation indicated.

Books have been written on ocular injuries, and there are many important phases of this subject which we might consider with profit if time permitted. It is hoped that what we have said may have some value.

OVER 5000 MANTOUX TESTS IN POLK AND NORMAN COUNTIES*

W. G. PARADIS, M.D.

Crookston, Minnesota

THE control of tuberculosis is entering a new phase based on scientific investigation and statistical information. Public health educational campaigns have characterized the past twenty years. The profession and the public have sought to control tuberculosis by stressing the importance of fresh air, good food, sufficient rest; by emphasizing the importance of a persistent cough,

loss of weight, and night sweats; by ultimately placing the bedridden, advanced tuberculous patient in the sanatorium. It is now recognized that these symptoms more often indicate a rather advanced disease. However, credit to this effort must be given in accomplishing the 50 per cent decline in the death rate from tuberculosis since 1910.

Today a new approach to the problem of tuberculosis has been developed. The tuberculin skin

*Read at the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 23, 1933.

test is one of the most accurate tests ever discovered in the field of medicine. In from ten days to three weeks, or sometimes longer, following the first infection with the tubercle bacillus, the body becomes supersensitive or allergic to the tuberculo-protein. It has been further established that 90 to 95 per cent of all infections from tuberculosis occur first in the lungs, and therefore a relatively high percentage of these first infections may be seen by the x-ray of the chest.

These two methods, the tuberculin skin test and the x-ray of the chest, extensively applied to large numbers, give a definite approach to the problem of detection of new cases and control of sources of infection.

Not many years ago it appeared that the majority of children were infected with tuberculosis by the age of puberty. More recently Meyers reported that less than 50 per cent of children in Minneapolis had such infection. A survey made by Slater in rural communities in southern Minnesota showed positive reaction in 10 per cent of a smaller series. In my own experience 305 Mantoux tests were given to adults with only 155 or 51 per cent reacting positively. This is a small group, but it gives some idea of the incidence of infection in an older group.

To add to this knowledge, and to promote further control of tuberculosis in northwestern Minnesota in the sanatorium district of Polk and Norman counties, comprising a population of 50,079 people living under essentially rural conditions, Mantoux tests have been given to 5,332 school children up to January 1, 1933. This represents 10 per cent of the entire population and 45 per cent of the total school enrollment of 11,682 in the two counties. X-rays of the chest were made on 783 of the 801 children showing a positive reaction.

Through the courtesy of Dr. Leo Rigler, Professor of Roentgenology at the University of Minnesota, all the x-rays were read by him in order to get an unbiased opinion from a qualified roentgenologist. Of the 537 children who reacted positively to O.T., 108 (20.1 per cent) had positive x-ray findings, while of 246 who reacted positively to M.A.-100, 67 (27.2 per cent) showed positive x-ray findings—an average of 22.3 per cent.

Polk and Norman counties comprise 2,863 square miles. Seventy-five of the 7,069 children

approached consented to have the Mantoux test performed. Fifteen per cent of those tested reacted positively. In Norman County, where all of the town schools and practically all of the rural schools were tested, we found that 8.5 per cent reacted positively in rural or country schools and 11.6 per cent in town schools. In Polk County, where only city and town schools were done, 18.4 per cent reacted positively.

Polk County has an incidence of tuberculosis almost identical with that of the state (1.5 per cent for the state and 1.58 per cent for Polk County). However, Norman County runs definitely lower, it being only .8 per cent. Norman County is almost entirely rural, the largest community having a population of about 1,200.

These figures tend to show that the percentage of positive reactors gives a rather accurate indication of the incidence of tuberculosis in a given community. No doubt the indication would be more accurate if all the children were tested, for doubtless some refusals are due to known exposure and the fear of the stigma of having had tuberculosis in the family.

The Mantoux test, whether done with Koch's O.T. or with M.A.-100, is not 100 per cent accurate, but it is certainly a very accurate test. We find families where some of the children react and others do not. Most of the time, this discrepancy can be explained by an accurate history. In others it is possible that the individual is not allergic.

Physical examination is of no value in detecting childhood tuberculosis. The Mantoux test and the x-ray are the means of diagnosing childhood tuberculosis. Clinical symptoms, when present, are, however, of very definite value.

Sometimes physicians oppose group Mantoux testing and x-raying of positive reactors on the theory that this type of work takes away some of their practice. The physicians in my sanatorium district have for the most part coöperated with me in my work, and those who were apprehensive regarding my Mantoux testing because of the above assumption soon learned that the amount of work that they did as a result increased rather than decreased. This is because of the fact that the general public is more apt to take advice from one who has no monetary interest in their children than from one who is interested only in recommending that the child see his family physician for other conditions than tuberculosis. It therefore follows that the sana-

torium physician should not infringe on general practice but that he coöperate with the family physician, giving him necessary information.

There is a splendid feeling and sense of co-operation between physicians in my sanatorium district and myself. We who are in sanatorium work feel that we are a part of the medical fraternity in our community and want to be treated as such by other men working towards the same goal: the alleviation of human misery and suffering.

We have also compiled a summary of all the people employed in the sanatorium since its opening, in regard to tuberculosis, which is very interesting because of the fact that we hear so much from authorities in the field of tuberculosis giving conflicting statements. One theory advanced is that a person who reacts negatively should not work in a sanatorium because of the danger of becoming infected or allergic. Another is that an individual who reacts positively should not work in a sanatorium because of the danger of acquiring an adult or secondary infection, which is dangerous. We might conclude from such statements that no one should work in a sanatorium. Of course, this creates an impossible situation.

Our figures show the following results: Three hundred thirty-five people have been employed in Sunnyrest Sanatorium over a period of seventeen years. The total number developing and breaking down with tuberculosis is eight, or 2.4 per cent. The total number developing tuberculosis, exclusive of ex-patients or those having positive family histories or positive x-ray findings when beginning work at the sanatorium, is two, or .59 per cent. The number of deaths from tuberculosis, including ex-patients and those with positive family histories, is four, or 1.2 per cent, as compared to 1.1 per cent for the general population of the state. Over a period of seventeen years the number of deaths occurring among this group who had no positive family history or no x-ray findings is 0. This is not a large series, but it represents a period of seventeen years and most certainly indicates that the sanatorium is not a dangerous place to work in. This shows that, whether a person has a negative or a positive Mantoux test, the working in a well-regulated sanatorium is as safe as any other occupation and probably safer than other public places.

Contrast this with a group of twenty-six adults with an average age of eighteen years closely associated in an educational institution where the incidence of tuberculosis was 34.6 per cent. I have been following this group for some time and expect to obtain complete histories, physical examinations and the Mantoux reports. The incidence in this group is high because of the fact that there was one proved source of infection, and probably two, in the institution. Two of this group are now dead, but the apparent original source of infection is still living. Her brother recently died of a miliary tuberculosis.

This paper is based on the facts as I have found them in my sanatorium district and therefore very little reference is made to the work of other men.

The problem of the further control of tuberculosis has passed beyond the stage of Public Health Educational Campaigns. If tuberculosis comes from tuberculosis, then our purpose must be to make an early diagnosis and follow this up with a search for the source of infection. The future policy of the control of tuberculosis must be along the lines of the following program:

1. Obtain the interest and coöperation of doctors and nurses.
2. Overcome the prejudice and misunderstanding of the public.
3. Apply the Mantoux test on all school children where consent can be obtained.
4. X-ray all children who react positively.
5. Find the source of infection in each case by special investigation.
6. Remove all those with active tuberculosis to a sanatorium for isolation and treatment.

An increasingly rapid decline in the death rate from tuberculosis can be anticipated by such a program.

Conclusions

1. Mantoux testing is of decided value in locating sources of infection.
2. The Mantoux test is one of the most accurate tests that we have in the field of clinical medicine.
3. Working in a tuberculosis sanatorium is no more dangerous than working among the general public.

4. Adults may easily contract tuberculosis when associated with an individual with active tuberculosis.

5. Follow-up work keeps the physician and general public alert and is very educational.

6. The general public will realize the danger of keeping one with active tuberculosis at home only by positive education on the part of the

private physician as well as the sanatorium physician.

7. The stigma associated with tuberculosis is disappearing in our sanatorium district because of the educational work done among our people by our physicians and nurses through clinic work and especially through the Mantoux testing of school children.

CASE REPORTS

ESOPHAGOBRONCHIAL FISTULA FROM A FOREIGN BODY IN THE LEFT BRONCHUS*

PORTER P. VINSON, M.D.

Rochester, Minnesota

Pulmonary infection almost always follows lodgment of a foreign body in the tracheobronchial tree. Immediately after aspiration of the foreign body, this infection may be acute and may lead to pneumonia or pleurisy with effusion, or, if the infection is present for a prolonged period, abscess or chronic bronchiectasis may develop.

Prompt recovery, with restoration of the pulmonary tissues to normal, almost always follows if the foreign body is removed immediately after it has been aspirated. Even when the body has been present in the bronchus for many months or years, its removal, together with bronchoscopic aspiration of the associated abscess, and dilatation of the accompanying bronchial stricture, usually results in complete recovery.

The following case is reported because of the unusual occurrence of ulceration into the esophagus, caused by the foreign body, with formation of an esophagobronchial fistula; removal of the foreign body produced an increase of symptoms rather than symptomatic improvement.

Case Report

A boy, while playing with an older sister, when he was six months of age, had choked and coughed. Because the sister had had a few harness rivets in her hand at that time, the mother thought that one of them might have dropped into the patient's mouth. A physician was consulted but he felt that the child had not swallowed or aspirated a foreign body, and a roentgenographic examination was not considered necessary. As the child became older, he had many respiratory infections, and, following a particularly severe infection at fourteen years of age, pleurisy with effusion was suspected. Roentgenographic examination was made

and a foreign body was seen in the region of the left main bronchus. The mother immediately identified the foreign body as the harness rivet that had been aspirated when the patient was a baby. A competent bronchoscopist was consulted and he removed the foreign body without difficulty. Instead of the usual cessation or diminution in symptoms following this procedure, the cough and expectoration became more pronounced and the patient found that swallowing liquids was almost always accompanied by strangulation. This was especially noted if the fluid was taken rapidly. Solid foods did not produce any disagreeable symptoms.

It was because of the strangulation on swallowing that the boy came to The Mayo Clinic, October 14, 1933. At that time he was sixteen years of age. Roentgenoscopic examination was made, and when the patient swallowed a suspension of barium a portion of it was seen to enter the left main bronchus and was then promptly coughed out of the air passages. Esophagoscopic and bronchoscopic examinations were both declined. As the patient was reasonably comfortable, he did not wish to consider surgical closure of the opening in the esophagus and bronchus.

CONGENITAL SOLITARY KIDNEY

RICHARD B. HULLSIEK, M.D.

Saint Paul

The term congenital solitary kidney implies the complete absence of one kidney and is not to be confused with renal hypoplasias and fusion anomalies. A review of available records indicates that most of our data concerning single kidney have come from autopsy reports.

In 1895 Ballowitz collected 213 cases from the literature; twelve in 28,423 autopsies, an average of one case in 2,400. Anders added seventy-three cases in 1910. His statistics show that these kidneys are especially prone to pathologic change, as out of 170 cases seventy-nine showed changes other than hypertrophy.

Since 1910 numerous other authors have added cases so that in his review of the literature in 1924 Goldstein found 349 cases. He added sixteen not collected by previous authors and included two personal cases.

In 1929 Hennessey analyzed twenty-three additional cases and added a case report, bringing the available records to 373 cases.

*From the Division of Medicine, The Mayo Clinic, Rochester, Minnesota.

Single kidney is often associated with other congenital malformations of the genital tract. Of 135 cases in which the condition was mentioned, Anders found ninety-four which showed changes in the genitalia.

Complete absence of all or a portion of the upper urinary tract on one side is due to a failure or faulty development of the ureteral bud and always results in a compensatory hypertrophy in the single kidney, with enlargement of the renal pelvis, which is not nearly so marked in those cases of compensatory hypertrophy acquired later in life.

One may encounter any of a variety of combinations in cases of solitary kidney, *i.e.*, complete absence of kidney, ureter and ureteric orifice on one side, with the ureter from the single kidney having its bladder orifice on the same or opposite side. The kidney alone may be absent, with a full length but more often a short rudimentary ureter ending in a normally placed and developed ureteral orifice. It is in this latter group that one is likely to assume the presence of a normal kidney on each side after simple cystoscopy.

The kidney may be situated in its normal position, over the spine, in the iliac fossa, or in the true pelvis. The vesical trigone may be symmetric with two normal appearing ureteral orifices or one orifice with a few vessels to mark the location of the absent orifice; or it may be asymmetric with the inter-ureteric ridge fading into the bladder near the midline.

The following case is one which from a clinical viewpoint must be considered as a congenital solitary kidney; and although this diagnosis has not been verified by operation or autopsy, sufficient evidence has been found to report it as such.

Case Report

C. R. L., a white man, aged 49, a carpenter, was seen May 2, 1931, complaining of pain in the right side of his abdomen. The pain began one week previous and was preceded by nausea and one vomiting spell. It was constant in character in the right upper abdomen and the region of the right costo-vertebral angle, referred later to the right testicle.

Past history: He had had smallpox at age of twenty-four. There was a history of pain in right side of abdomen in 1904, which was diagnosed as appendicitis, but no operation was performed. At that time he remained in the hospital eleven days and there has been no recurrence of this pain until the present illness.

Physical examination. Except for the presence of a tender palpable mass in the right flank and abdomen, examination was negative. The temperature was 98.6°, pulse 70, respirations 20, blood pressure 140/76. Urinalysis: s. g. 1014, albumin faint trace, sugar negative, microscopic, r.b.c. 1 to 4, and pus cells 5 to 10 per high power field. Blood examination: Hemoglobin 75 per cent, erythrocytes 4,380,000, leukocytes 9,350; differential, neutrophils 68 per cent, lymphocytes 27 per cent, monocytes 2 per cent, eosinophiles 2 per cent, basophiles 1 per cent; Wassermann negative. Blood chemistry, sugar 78 mgms., creatinin 1.6 mgms., urea nitrogen 40.7 mgms.

Cystoscopy: The external genitalia were normal. Bladder capacity and contour were normal. The right margin of the trigone was slightly elevated, the right ureteral orifice normally located and showed occasional contractions. The interureteric ridge was normal as it left the right orifice but disappeared in the bladder wall near the midline. There was no sign of any left ureteral orifice in the usual location. The entire left

half of the trigone appeared to be absent. Indigo-carmin given intravenously failed as an aid in finding a left ureteral orifice either in the bladder or prostatic urethra. No trace of the dye was seen at the right orifice in ten minutes, although activity was observed in the form of contractions of the orifice.

A number 5 F. ureteral catheter was passed 25 cms. on the right side and immediately a steady dropping of



Fig. 1.

blue tinged urine was seen. One hundred and twenty-five cubic centimeters of indigo-carmin tinged urine was then aspirated.

Injection of sodium iodide was then commenced and when 35 c.c. had been injected the patient complained of a feeling of fulness in the right side of the abdomen, so the injection was stopped and a urogram made.

The iodide was then aspirated. The urine from this kidney on analysis, showed: Albumin, trace; pus cells 3 per high power field. Smears showed no bacteria; culture no growth. The urogram (Fig. 1) showed evidence of pyelectasis due to uretero-pelvic junction obstruction in a markedly enlarged right kidney and pelvis. There was no evidence of a shadow denoting the presence of a left kidney. Subsequent urograms made by the intravenous method also failed to disclose any evidence of renal tissue on the left side.

The catheter was left *in situ* for drainage. No reaction followed the cystoscopy. The symptoms complained of were relieved by drainage with the inlying ureteral catheter.

May 8 the blood chemistry showed: sugar 95 mgms., creatinin 3.3 mgms., urea nitrogen 49.1 mgms.

May 15 the blood urea nitrogen was 33.6 mgms., and phenolsulphonphthalein first hour 200 c.c., 25 per cent, second hour 165 c.c., 14 per cent.

May 20 the blood urea nitrogen was 23.4 mgms.

May 25 the patient was discharged from the hospital.

An intramuscular phenolsulphonphthalein on June 3 showed a 55 per cent excretion in two hours.

This patient is free of symptoms and has good renal function at the present date.

1360 LOWRY MEDICAL ARTS BUILDING.

METHYLENE BLUE IN THE TREATMENT OF CARBON TETRACHLORIDE POISONING

Preliminary Report Of Three Cases

ROBERT LYMAN NELSON, M.D.

Duluth

A search through the literature has failed to disclose the use of methylene blue, or methylthionine chloride, in the treatment of carbon tetrachloride poisoning. The following cases are presented in the hope that further observations may determine its actual value.

No explanation of the possible physical or physiological effects of the drug is offered. Its action in carbon monoxide poisoning is controversial, especially from the laboratory side. It is even more so in relation to cyanide poisoning. Especially in the former, the clinical effects have caused it to be widely used.

As to my reason for using it, I can offer no feasible explanation except, perhaps, the symptom association which I have noted in the less acute carbon monoxide intoxications.

Case Reports

Case 1.—March 26, 1934, R. O., a woman aged forty-two, floorlady at a dry-cleaning plant, presented herself with primary complaints of continued nausea and vomiting when she came in contact with carbon tetrachloride fumes. These had been increasing in intensity for the past month and especially so the past week. She was losing weight, was very irritable and stated that she could neither eat nor sleep, but these symptoms tended to diminish when she was away from the plant.

General examination was essentially negative. Distressing climacteric phenomena were at first suspected but given less importance on continued questioning.

Fifty c.c. of 1 per cent solution of methylene blue were injected intravenously and she was given 1½ gr. of phenobarbital to take on arriving home. She was also given an alkaline bismuth powder to use at hourly intervals for about six doses.

The immediate reaction was one of mild shock with a feeling of weakness and general perspiration and sensation of numbness in the arms and legs. This disappeared in about twenty minutes, at which time she felt quite able to go home unassisted. On the following day she felt a little tired, but nausea had disappeared and on the day afterward she felt quite normal. Nausea and vomiting, weakness and irritability had disappeared. She continued to work every day under essentially the same conditions as before. This improvement lasted for about two weeks, at which time she again started to show some of the same symptoms in a milder degree. She has had no repetition of the original treatment nor any other treatment.

Case 2.—On March 28, 1934, W. F., a male aged twenty-nine, cleaner in the same dry-cleaning plant, called me to ask if he could get the same treatment that his co-worker had received. For two months he had been noticing an increasing susceptibility to the fumes of carbon tetrachloride. This was manifested by a feeling of weakness, nausea, anorexia and insomnia. The nausea was becoming troublesome in his

work. All symptoms tended to diminish over weekends when he was away from his work. At his request the same procedure as employed in Case 1 was duplicated with almost identical results, i.e., initial mild shock symptoms and sensation of numbness in the extremities disappearing in about fifteen minutes, after which time he went to his home unassisted and returned to work the following morning. Up to the present time (five weeks later) he has had no recurrence of his symptoms.

Case 3.—On March 31, 1934, M. D., a male aged twenty-nine, called me on the telephone to ask if he could take "the cure." He explained that he meant the treatment which had been so dramatic as to justify the use of the term. He, too, presented essentially the same complaints as the others, being exposed to the same fumes in the same plant in which there had been a distinctly troublesome and temperamental ventilating system. The same treatment was here administered with the same result for the first two weeks. Following that a gradual reappearance of the sensitivity to the fumes again appeared, though in much milder degree.

Summary

Three cases are presented in which a very definite history of exposure and susceptibility to carbon tetrachloride fumes allowed a presumptive diagnosis of carbon tetrachloride poisoning. All three cases showed nausea, anorexia, weakness and insomnia. Nausea and irritability were exaggerated by exposure to the fumes in all three cases. The same treatment was employed in all three cases. In Cases 1 and 3 a single administration of methylene blue was followed by a cessation of all symptoms for two weeks. In Case 2 symptoms are still absent five weeks later. The duration of the symptoms was one month, two months, and one year, respectively. In Case 3 no previous attempts at eliminating the symptoms complained of had been satisfactory with the single exception of absence from exposure. The first two cases had had no previous treatment.

Obviously, these three cases do not justify any satisfactory conclusions, nor is there any attempt to account for the results obtained.

HORLICK'S MALTED MILK ACCEPTANCE WITHDRAWN

The Committee on Foods reports that the container label and advertising for Horlick's Malted Milk present explicit infant feeding formulas for infants aged from 1 week to 12 months. The manufacturer, Horlick's Malted Milk Corporation, was informed that the promulgation of feeding formulas in lay advertising is considered to be in conflict with the best experience, authoritative judgment and basic principles in infant feeding, and that the feeding of an infant by routine feeding formulas and instructions distributed by food manufacturers, or according to directions, printed materials, or advice of any person other than the attending physician, may seriously endanger the health of the infant. The manufacturer expressed himself as unwilling to remove the feeding formulas from advertising addressed to the public for merchandising reasons. The acceptance of Horlick's Malted Milk is withdrawn and the product will no longer be listed among the Committee's accepted foods. (*Jour. A. M. A.*, April 15, 1933, p. 1175.)

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BUSINESS MANAGER

J. R. BRUCE, Saint Paul

Volume XVII JUNE, 1934 Number 6

Alpha Dinitrophenol

The numerous references in the literature the past year to dinitrophenol as a weight reducer and the appearance of the drug on the market in recent months have led to a considerable amount of clinical trial and a noticeable difference of medical opinion regarding its use.

The toxic effects of the drug on munitions workers during the World War, which included loss of weight, led Tainter and his collaborators at Stanford University to study the drug and its effects on metabolism. It was found to increase metabolism in animals, although not a substitute for thyroid in cases of thyroid deficiency and, if given in toxic doses, produced pyrexia and death from circulatory failure.

The reports of Tainter and his associates indicate briefly that the drug increases the cellular metabolism of fat and carbohydrate not disturbing the nitrogen balance, throws more glycogen from the liver and muscles into the circulation and in moderate doses produces no demonstrable damage to any of the organs.

Small doses of 3 to 6 milligrams per kilo of body weight, according to the author, pro-

duced an increase in basal metabolism of 20 to 30 per cent without effect on the pulse or respiratory rates or the blood pressure, and a gradual loss of two to three pounds in body weight per week. Larger doses of 5 to 10 milligrams per kilo were accompanied by sweating, increase in pulse and respiratory rate and more rapid loss of weight. Doses over 10 milligrams produced more toxic symptoms of apprehension, fever, sweating, rapid pulse and respiration and air hunger.

Deaths from large doses have been reported in two cases preceded by pyrexia and circulatory failure.

From the trial of the drug so far it seems that a valuable addition has been made to our armamentarium. This statement is made with some reservations and the warning that perhaps a greater percentage of individuals have an idiosyncrasy to the drug as manifest by the development of toxic symptoms, especially skin rashes, than is true of many other drugs. Certainly the physician should direct the use of the drug and it should not be sold directly to the public, as at present it is. Its administration should be begun with small doses of a grain and a half a day, cautiously raised until the patient shows a slight loss of weight and only rarely increased above four and a half grains per day in divided doses. If the patient is warned against the appearance of toxic symptoms and the drug is not continued for more than two or three months, it is not likely that serious harm can result. Diabetes should be a contra-indication while hypertension is apparently not aggravated.

Dinitrophenol apparently has distinct advantages over thyroid medication as a weight reducer. While doubtless most patients will still have to curb their appetites and not place sole dependence on the drug, weight is lost even on doses not sufficient to produce toxic symptoms. In certain instances where thyroid medication is not successful or is contra-indicated, dinitrophenol has been successfully used.

With the further warning that proof of the non-cumulative action of the drug has so far not been reported and therefore the drug should not be administered indefinitely, the subject may for the time being be dismissed.

Artificial Pneumothorax in Pneumonia

One of the most startling suggestions in the realm of therapeutics is that of inducing pneumothorax for the treatment of lobar pneumonia. As in the case of other proposed methods it seems that this treatment is not entirely new, for the literature contains the report of a total of fifty cases of pneumonia so treated since 1921, with only three deaths. No cases apparently have been reported in American literature. The writers, without exception, have been enthusiastic about the results.

In an effort to evaluate the procedure experimentally, Lieberman and Leopold* artificially produced lobar pneumonia in thirty-six dogs and treated half of them by producing artificial pneumothorax on the consolidated side, the other half having been used as controls. Fifteen of the eighteen dogs treated by pneumothorax recovered, whereas only five of the controls survived. Some 400 c.c. of air was injected on the affected side two days following the installation of virulent pneumococci in starch broth and was repeated the following day. Each injection was followed as a rule by prompt improvement of symptoms resembling a true crisis, as occurred in the clinical cases reported.

No attempt was made by the authors cited to explain the *modus operandi* of the treatment. Air in the pleural cavity on the affected side might well separate visceral and parietal pleural surfaces if given early in the disease and thus tend to relieve pain and lessen irritation from respiratory movement in a consolidated lung. On the other hand one might expect a diminution of tidal air in the uninvolved lung on the same side—a result not particularly desirable.

Certainly the authors are conservative in their suggestion of the clinical application of this method of treatment. They are emphatic in their assertions that the treatment is not universally applicable and they warn that too much air will embarrass the opposite lung by mediastinal displacement. They further emphasize, and rightly, that the pneumonia patient is not a fit subject upon whom to learn the technic of artificial pneumothorax.

We shall await with considerable interest the report of the clinical trial of this new method which these authors are to publish soon.

*Lieberman, Louis M., and Leopold, Simon S.: Therapeutic pneumothorax in experimental lobar pneumonia in dogs. *Am. Jour. Med. Sci.*, 187:315 (March), 1934.

COMMUNICATIONS

To the Editor:

In the March, 1933, issue of MINNESOTA MEDICINE I reported a case of diverticulum of the gallbladder. After looking up the literature on this subject I found that only fifteen such cases had been reported up to this date, with only six from our country. Such being the case I have another to report, thus making a total of seven in this country.

On December 27, 1933, I was called to see a patient who was having a typical gallbladder colic and treated him accordingly. He was forty-eight years of age, single and had lived in this country nine years. He was brought to the hospital and treated medically until December 29, at which time operation was indicated.

Spinal anesthesia was used, an upper right rectus incision was made, a few adhesions about the gallbladder were freed and I could see that the gallbladder was in a condition that rupture might take place very easily. The serous lining over the fundus was very thin, beneath it being a stone 1.5 inches in length and 0.5 inch in thickness. In the cavity proper was a stone of similar size. The gallbladder was removed and a rubber drain was inserted laterally. Everything went along nicely for two weeks, at which time an abscess developed in the rectum, but after that was opened and drained for two days, healing took place and no other complication occurred.

I sent this specimen as well as that from the other case to the pathology department at the University of Minnesota, where Dr. E. T. Bell examined them, and reported both to be true diverticula.

A. L. PERTL, M.D.

BACTERIOPHAGE THERAPY

The early hopes of bacteriophage therapy have hardly been realized. In spite of much experimentation, which has shown why bacteriophage could not function therapeutically, at least as a specific agent pitted against a specific infection, clinical observations have been accumulating which indicate that intravenous injection of bacteriophage may have beneficial effects. The material labeled "bacteriophage" which the clinician injects into a patient with severe septicemia is obtained by first growing the particular bacterium on a broth medium and then introducing bacteriophage into the turbid culture. After further incubation the material becomes entirely clear, showing that the bacteria have been dissolved and killed by the bacteriophage, the concentration of which has increased sufficiently to cause bacterial disintegration. Obviously, such a bacteriophage solution is not a simple solution or suspension of bacteriophage. These disintegrated cultures of bacteria may therefore be considered supervaccines containing all the chemical constituents of the bacteria. Larkum has advocated, in general, the use of lysed bacterial cultures instead of the ordinary vaccine as being much more effective. Though the use of bacteriophage as a specific agent has been disappointing, it may yet yield important results by showing how more effective vaccines may be prepared. (*Jour. A. M. A.*, May 6, 1933, p. 1431.)

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association

B. J. Branton, M. D.

W. F. Braasch, M. D., Chairman

J. C. Michael, M. D.

Home For Cripples

Is sickness insurance working out well in Germany? In England? Denmark? France? Austria?

Proponents of health insurance in the United States frequently circulate glowing reports of the increase in available medical service, the individual security, the generally rosy outlook for the health of Europe as a result of their systems of sickness insurance.

Less glowing reports are to be found, however, by any impartial student of the matter who wishes to take the trouble to hunt for them in current literature.

Following is an excerpt from an article by a German physician, Dr. M. Kirschner, *Zur Praxis der Begutachtung*. It should be of interest to Americans to whom a system of medical care, similarly supported by regular payments from all has been held out as the solution of all our difficulties.

Dr. Kirschner says:

"The insured also believe, since they have long contributed to the cost of insurance, that after a certain time *they have a right* to receive some money from it, and only a few workers realize that the existence of an insurance system depends on regular payments from all in order that the individual, as an exception, may obtain something. It is easy to implant the idea in the consciousness of a simple man: 'Now that I have paid so long, I will at last get something out of my insurance.'

"The fact that demands for damages and for raising the rate of payment are practically unlimited and cost the insured nothing to bring, and that, if denied, decisions of higher officials may be demanded *without cost or danger*, creates covetousness, quarrelsomeness and simulation; one can at least try everything, and try to drag out a little more; trying costs nothing.

"In this way the *ominous will to be sick* is artificially created, and social institutions are many times practically compelled to put a premium on sickness, laziness, exaggeration and deceit, so that the individual, who is in a manner the innocent victim of these compulsory institutions, cannot make any special individual objection. Since legal compulsion has today brought the majority of the population within the scope of social insurance, a constantly increasing proportion of the workers is brought into a condition of subjection to these institutions. Present-day Germany has been compared to a great *Lazaret*, or *home for cripples*, where each individual is trying to get as much as possible out of the gigantic pension cup, which is kept filled by ever higher contributions. Every seventh German is today a social pensioner."

Noblesse Oblige

The Minnesota plan for medical care of government relief wards is proving expensive according to F. M. Rarig, Jr., executive secretary of the State Emergency Relief Administration, and Benjamin E. Youngdahl, director of the Division of Relief.

These two state officials made this important declaration at a luncheon meeting called recently by Dr. N. O. Pearce, Minneapolis, chairman of the state medical committee that assisted in formulating the plan last fall.

Two principal sources of expense were cited by them as calling for some alteration.

One was mileage costs; reduction of these bills by restricting patients to a choice of physicians within easy reach was advised and is now a virtual certainty.

The other involved medical over-charging, including such items as unnecessary house calls.

Bills Seem Large

Some of the bills presented for medical service seem to the State Relief Administration to be too large. On the surface, at least, it would seem that minor operations assume major proportions in the mind of the operator, when he is making out a bill to submit to the administrator of government funds. The same applies to some forms of obstetrical practice.

In many cases, to be sure, considerable specific detail must accompany the bill if the relief administrator is to understand its justice. Often the county relief agent should be given personal and complete information in the first place.

In any case, the status of the patient and the amount of money he might be expected to pay under normal circumstances should be considered in making charges—not the fact that government money is available under the medical relief plan, to pay his bills.

Will Investigate

The State Medical Association has requested full information from the Relief Administration as to the actual amount of money spent in each county on relief for medical care, medicines and nursing care. Also the total amount spent in the same counties through Federal Emergency Relief for the general relief of the poor. With these figures, the Association hopes to be in a position to assist in investigating the justice of Relief Administration charges. Another meeting with these officials will be arranged as soon as such a study has been made.

The seriousness of the matter was not minimized by the medical committee. The members pointed out, how-

ever, that over a period of some ten months in which the medical relief plan has been operating in Minnesota only one complaint had been brought to their attention—that of a non-member physician who had allegedly failed to give a proper examination for two transient camp members.

The fact that any significant amount of over-charging had occurred came as a complete surprise to the medical association officials.

Depends On Physicians

Obviously, the success of the plan as it was originally outlined, depended to a considerable extent upon the physicians.

If the physician took advantage of the plan to make unnecessary calls there was no one who could say to him with any authority: "That was an unnecessary service."

Members of the Minnesota State Medical Association who are caring for relief patients are under a special obligation to watch their charges closely; to avoid any slight suspicion of "chiselling" even though their charges fall within the letter of the regulations.

The amount of money available for relief in Minnesota is strictly limited. There is no bottomless sock from which anyone can draw to the limit of the regulations for food, clothing, shelter or medical care for the unfortunate. If the doctors, for example, should use too much, it would mean that somebody might go hungry.

Offer Assistance

The Council, the officers and committee chairmen of the Minnesota State Medical Association offer every assistance in their power to the State Emergency Relief Administration, to see that the poor have good care, and charges are not exorbitant, as well as to see that doctors are treated fairly.

Members of the association who have any complaint on their own part to make about the operation of the plan or who want information on regulations are asked to write to state headquarters, 11 West Summit Ave., Saint Paul, immediately.

Summer Round-Up

The 1934 Summer Round-Up of the Children conducted by Parent-Teacher Associations is now under way in Minnesota.

No doubt thousands of children will be benefited by it and the benefit will be in direct proportion to the educational effort that is directed toward thorough examinations by and regular consultations with the family physician.

There is no doubt, also, that differences will arise between physicians' organizations and the enthusiastic and, occasionally, misguided officials of the movement.

When the campaign has run into difficulties and produced contention, the fault usually appears to have been failure on both sides to understand and carry out the real objective of the movement.

The first paragraph of the leaflet entitled "The Summer Round-Up of the Children, 1934 Plan of Procedure" which was sent to all Summer Round-Up chairmen, admirably defines that objective.

Objective

"The Summer Round-Up of the Children is a campaign to send to the entering grade of school or kindergarten a class of children as free as possible from remediable defects. The ultimate goal is to educate parents to the need for early periodic examination of their children by the family physician and dentist in order to insure correction of hampering defects which might not otherwise be discovered until the child enters school."

It is, of course, with the schemes for carrying out this objective that physicians have sometimes quarreled—not with the objective itself.

Where the superficial, unsatisfactory mass examination of children is held to be a complete realization of Summer Round-Up objectives, physicians' organizations have rightly complained.

These legitimate complaints should not, on any account, take the form of indignant withdrawal of all official interest and assistance in the movement, however.

That course of action has unfortunately been tried. Result: Misunderstanding and indignation on the part of thousands of honest and well-meaning members of parent-teacher organizations; continuance of Summer Round-Up programs with objectionable features emphasized rather than removed as a result of medical society action; general public misunderstanding of the medical point of view.

The policy of the American Medical Association, which serves with the other national organizations as a member of the advisory committee to the Summer Round-Up, is one of friendly coöperation and assistance.

Friendly Medical Advice

The American Medical Association goes further than that. It provides most of the examination blanks used for recording physical findings in Round-Up examinations. But it keeps the emphasis in all instruction that goes out from national headquarters on the real objective of the movement. It assists by friendly advice and coöperation to remove as far as possible, from a national standpoint, the objectionable phases of the program.

Keeping always before the Parent-Teacher groups that they are working, not toward an ideal to be expressed in any number of children examined in a given time, but toward more children adequately and regularly cared for by their family physicians, the American Medical Association in its House of Delegates has repeatedly endorsed the Summer Round-Up movement.

Minnesota Policy

The Minnesota State Medical Association took a similar stand in 1930 when its House of Delegates accepted as a statement of its policy a letter written by Dr. S. H. Boyer of Duluth, then president of the State Association, to Mrs. A. A. Mendenhall, also of Duluth

and at that time president of the Minnesota Congress of Parents and Teachers. This is the letter:

March 12, 1934

Mrs. A. A. Mendenhall, President
Minnesota State Parent-Teachers Association
1528 Jefferson Street
Duluth, Minnesota
In re: Summer Round-Up of Children of Pre-School Age.

Dear Mrs. Mendenhall:

Answering the request of the Parent-Teachers Association for endorsement of the above mentioned movement by the Minnesota State Medical Society:

First: The Minnesota State Medical Society is in sympathy with anything tending to promote either public or private health or both.

Second: We are not in favor of health examinations *en masse*, inasmuch as we believe this method to be wasteful of time, inefficient in process and therefore faulty in its final diagnostic conclusions and advice as to treatment.

Third: We believe that physicians lending their aid to this activity should render thoroughly good service and receive commensurate compensation for their work.

Fourth: It is our belief that, in the prosecution of this work, the parents and guardians of children about to enter school should be encouraged to have their children examined by physicians of their own choice (preferably their family physician) and at their own expense. The children of those who for any reason are unable to meet their financial obligations should be examined by one or another of the free agencies.

Fifth: We recognize that in some few localities, owing entirely to local conditions, the examination must be conducted at public expense.

Taking the above provisions into consideration and believing that your association will not be unmindful of them in carrying on your work, the Minnesota State Medical Association whole-heartedly endorses the movement and assures you of its genuine coöperation.

Very respectfully yours,

S. H. BOYER, M.D., *President*.

Medical men should remember that there are more than 40,000 members of Parent-Teachers associations among Minnesota mothers and fathers alone. That figure does not take into account the large number of other persons who also take an active interest in the program of the organization.

All of these people believe profoundly in the worth and desirability of the Summer Round-Up program.

Physicians who may disapprove it without offering a practical plan of procedure to take its place must answer for their short-sightedness to a large and influential and well-organized group of men and women.

Misleading Travel Tales Czarist Medicine Is Defended

As a result of economic conditions, mal-adjustment has affected various phases of our social structure and many attempts have been made, largely by theorists, to correct them. Because of its predominant status in the affairs of life, medical care has come in for its share of attention.

Theorists, with the financial support of several Foundations, have been striving in recent years to influence public opinion to demand immediate solution of medi-

cal problems. Because of economic distress, members of the medical profession have become willing to try almost anything to improve their own status. Many of the suggestions made for improvement of the present situation are based more on theory than on fact. Among these are statistics derived from so-called investigations of socialized forms of medicine abroad. Proposed methods which appear on the surface to be solutions of our problems, on careful inspection are seen to lack careful investigation and scrutiny of facts. Deductions have been made which are in some instances erroneous and misleading.

"Incredibly Better"

An example of this is a book entitled "Red Medicine," recently written by Sir Arthur Newsholme, M.D., and John Adams Kingsbury, LL.D. The authors compare the practice of medicine as existing in Russia today with that formerly existing in Czarist Russia. They are fully convinced that "for the vast majority of the total population the medical care now given in Soviet Russia is incredibly better than formerly, both in quality and availability." They infer that the socialized medicine adopted by Soviet Russia might well be applied to our own needs.

The book was recently reviewed by Henry A. Koiransky, M.D., in the *New York Times* Book Review. Dr. Koiransky finds on investigation that the book is full of fallacies and erroneous conclusions. In the first place, Messrs. Newsholme and Kingsbury required only four weeks, spent in traveling over 9,000 miles, to come to the most audacious conclusions that "what the Soviets have accomplished in their courageously original schemes for the health and social well-being of the people constitutes a challenge to other countries." He finds that much of this information was gathered from conversations with Soviet officials, although the investigators did not know the language and had to rely upon interpreters.

Communist Quality

A survey of medical facilities existing in Czarist Russia made by the reviewer shows that the alleged increase in facilities and improvement in medical care is not based upon fact. As to the quality of the Soviet medical staff, the critic writes, "We have a letter from the late Dr. L. O., a brilliant bacteriologist of one of the largest cities of Soviet Russia, and one of the many victims of post-war conditions in Russia. It is but one of others which reveal facts not without significance. A young Communist, second year medical student of the University of Kazan, is examined in physiology. The student comes from the rank of manual workers (a so-called 'vidvigenetz'). He is requested to give the composition of air. Here is the answer: '10 per cent of oxygen, 5 per cent of hydrogen, 65 per cent of nitrogen and 10 per cent of temperature.' The professor of physiology refused to pass this student, but had to submit to the order of the party official present at the examination: 'Comrade N. has to

be re-examined in a fortnight on the same subject, after re-reading and finding the correct figure!"

The reviewer concludes that the report made by Messrs. Newsholme and Kingsbury is misleading to the uninformed reader, it places the medical achievements of pre-revolutionary Russia in a false perspective, and it is not a sufficiently thoroughgoing analysis of the existing situation to merit recognition as a scientific investigation of facts.

Moral: Let us get at the real facts and results of experience before we try radical theories in Medical Practice.

Reforms for America

Speaking before the Western Hospital Association, recently, Mr. Kingsbury offered the following suggestions for America, based upon studies made by the Milbank Foundation. This foundation, it will be recalled, was one of the principal supporters of the Committee on the Costs of Medical Care and has expressed itself on several occasions as dissatisfied with the absence of tangible results from the majority report brought in by that committee.

Mr. Kingsbury now urges:

1. Compulsory sickness insurance for all families with annual incomes of less than \$3,000 or, perhaps, \$5,000. Medical benefits under such a scheme would fall into two classes: one to include payment of the general practitioner and, perhaps, for prescribed medicines; the other, not mandatory, to include payment for services of medical specialists, dentistry, nursing, laboratory and clinic services, etc.

Per Person \$7.50

2. That the general practitioner be paid a sum equivalent, at least, to \$7.50 annually for each insured person. The amount, of course, would be set by legislation. Mr. Kingsbury points out that the practitioner who serves 1,000 potential patients would receive a gross income of something like \$7,500, adding that "the practitioner who serves 2,000 obviously would receive more."

3. That the total cost of insurance per person be financed 20 per cent by taxes and 80 per cent from direct contributions of insured persons, or contributions shared by employers and employes, or borne entirely by the state. The total cost per person he estimates at approximately \$36 a year.

Lay Supervision

4. That there should be lay supervision for financial and executive problems.

5. That there should be professional supervision of professional personnel and problems, with a judicial agency combining lay and professional representatives to deal with complaints and grievances.

This and many other official statements definitely place the Milbank Memorial Fund of 40 Wall Street, New York City, behind a compulsory state system for the delivery of medical service. Mr. Kingsbury, in his

western address, carefully refrained from any discussion of the difficulties that have been encountered in experiments with this kind of service among the poor.

His address follows, with significant closeness, upon his enthusiastic account of a comparable system in Soviet Russia.

Helping the "In-Between" Fellow

An interesting attempt to help the "in-between" fellow of small wage to pay for his own medical service is now in progress by the Medical Service Bureau of the Wayne County Medical Society of Detroit.

Results noted in the first report of the bureau, recently published, cover four months and are merely suggestive.

But medical societies everywhere will certainly read this and subsequent reports with interest, since a successful bureau of the sort organized in Wayne County would solve a good many of the current problems of medicine and solve them without recourse to insurance or group practice or third party contracts.

The purpose of the Wayne County Bureau is, in the words of the *Detroit Medical News*, "to make available to every employed person of limited means a full and complete medical service." The Bureau offers facilities so that all bills for medical, surgical and hospital care are coordinated and easily liquidated by the man or woman of small wages over a period of fifty-two weeks.

No Dues, No Fees

"This is *not* an insurance plan," declares the *News*, "No dues, no fees, no premium of any kind are charged before the medical service is rendered. It is an honest attempt to help the 'in-between' fellow and the members of his family."

"This class of patients has always been the mainstay of every business," the bulletin further points out, "and of every successful medical practice. At present, many people in this class find themselves with no cash reserve. They have jobs; they need medical attention. They do not want charity, but because they do not know what to do, many procrastinate, sometimes to their disaster."

The plan calls for coöperation with employers of labor and, to date, twenty-two large industrial employers have promised their coöperation to the extent, in some cases, of employee loans; in others, of guarantees that installments will be met; in others, of payroll deductions.

The Bureau does not set fees. It merely interviews the patient or anyone familiar with family circumstances, investigates and works out a plan for liquidating the account based on the actual financial conditions of the family. The majority of hospitals are coöperating and hospitalization is provided for on the same basis as the recommendation of the doctor.

To date, about 50 per cent of the patients handled through the Bureau have come from industrial plants, sent by employers. The rest have been sent by physicians of Detroit.

Looking for Trouble

Everybody knows what trouble there is when nursing programs are launched and carried on without medical direction. Medical men justly complain of it. Nurses' organizations deplore it.

An effort has been made by the State Board of Health, working at the behest of the State Board of Control, to avoid such trouble in the future conduct of relief programs employing nurses in Minnesota.

The employment of fifty nurses in various kinds of relief work is now under preparation by the State Board of Control. The State Board of Health recently submitted a plan for the direction of these nurses. It was designed to secure physician leadership for these programs in every community.

The proposed plan was outlined and sent to 100 committee chairmen, officers, council members of the Minnesota State Medical Association, for their study and suggestions.

The hiring and launching of these nurses waited only for approval from Washington. It might come any day.

Did the physicians who have so often and so heartily agreed that medical men should be in charge of such projects, hasten to answer this call for their assistance in a matter which intimately concerns the practice of medicine in Minnesota?

They did not. At least they did not do so in any great numbers.

After more than a month, four have now sent their comments to Chairman E. S. Boleyn, Stillwater, of the Public Health Nursing Committee.

The responsible authorities came to the State Medical Association to ask for help and leadership.

If members of the Association ignore the appeal, they will have small grounds for complaint if the conduct of these nurses does not meet with their approval later.

Good Meeting

Two successful district medical society meetings have been held this spring that may be suggestive for programs in other districts.

One was at Fergus Falls, the other at Crookston. Both were inter-professional meetings with clergymen, dentists, nurses and druggists invited to dinner. A popular dinner speaker talked at dinner and again to the guests and members of the Auxiliary at a public meeting later, while medical society members held their meeting.

The speaker in both cases was Dr. Walter S. Judd, Fellow of The Mayo Clinic at Rochester and medical missionary in China.

Excerpts from letters on the Crookston meeting, April 25:

"I wish you could have been here to see the enthusiastic reception given Dr. Judd both at our banquet and at the public meeting. I certainly can see where a man of his caliber would be invaluable in representing the medical profession to the public. He certainly did last night.

"We had a hundred at the banquet, with prominent laymen, clergy, dentists and druggists as guests.

"At the public meeting we must have had about 600."

C. L. OPPEGAARD, *Secretary*,
Crookston.

"The meeting here Monday night was a huge success. We had men in, who have not shown up for years. Several indicated they would pay their dues and get into the game. Have not had the exact count but the attendance was very large and the spirit good."

W. L. BURNAP, *Councilor*, *District No. 8*,
Fergus Falls.

Advice to Editors

From the "Be On Your Guard" column of the N. E. A. Service Letter, issued by the National Editorial Association to its members:

"Dr. E. W. Lyon, 522 East Genesee Avenue, Saginaw, Michigan: This party submits copy for display advertisements of mail order cure for pyorrhea and asks billing monthly. Investigation indicates that this 'dentist pyorrhea specialist' is a Mr. Quail, a dental mechanic, who has simply adopted the name, 'Dr. Lyon.' Credit rating very poor. Refusal of advertising advised."

Lou Benshoof, editor of the *Detroit Lakes Record* and chairman of the Medical Contact Committee of the Minnesota Editorial Association, applied to the Minnesota State Medical Association office for information on "Dr. Lyon" in the first instance. The state office turned the matter over to the Saint Paul District Dental Society for investigation and forwarded the information to Mr. Benshoof with the above result. Friendly contact with the Editorial Association operates to help in the work of cleaning up and censoring the patent medicine quack advertising printed in country newspapers.

Note also, this one from the same letter:

"S M S Laboratories, Inc.—A fraud order was issued December 7, 1933, against the S M S Herb-Nu Health Institute, S M S Herb-Nu Remedies, Mother Helen, Mother Helen's S M S Remedies, Mother Helen's Herb-Nu Remedies' Company."

Minnesota State Board of Medical Examiners

Check Artist Posing as a Physician Sentenced to Ten Years

*State of Minnesota vs. Robert G. Reinardy, alias
"Dr." R. G. Brian*

Robert G. Reinardy, twenty-six years of age, 1290 Grand Avenue, Saint Paul, was sentenced on April 27, 1934, by the Honorable James C. Michael, Judge of the District Court, to a term of not to exceed ten years at the St. Cloud Reformatory, following a plea of guilty entered by Reinardy to a charge of forgery in the second degree.

For the past six months Reinardy has been posing in Saint Paul as a physician under the name of Dr. R. G. Brian. Using the name of Dr. Brian he cashed a check for \$9.00 at the Hillcrest Grocery at 140 W. Summit Avenue, Saint Paul, Minn. When the check came back from the bank marked "no account" the proprietress of the grocery store telephoned the State Board of Medical Examiners for the address of Dr. Brian. There being no Dr. Brian registered under the Basic Science Law, an investigation was immediately made in coöperation with the Saint Paul Police Department which resulted in Reinardy's arrest on April 16 on a charge of forgery. Following his arrest a medicine kit containing various medicines and narcotics was found in Reinardy's home. Shortly after his arrest Reinardy signed a confession admitting that he had cashed several checks and that he had been posing for several months as a physician. He has examined patients and furnished them with medicine, but denied that he ever made a charge for his services. Reinardy's favorite story was that he was a graduate of the Medical School of the Northwestern University; that he had been practicing medicine for nine years. He also stated that he took patients to the Miller Hospital in Saint Paul and St. Mary's Hospital in Minneapolis. This statement on Reinardy's part is absolutely false. Reinardy has never had any medical education whatsoever and at no time has he ever been connected with the Miller Hospital nor St. Mary's Hospital.

Following an investigation by the Probation Officer Reinardy's sentence was stayed and he was placed on probation for three years. He is to report regularly to Mr. Doyle, the Probation Officer, and is to make full restitution for the checks which he cashed. According to the records of the Police Department, these checks approximate \$465.00.

The State Board of Medical Examiners wishes to express its appreciation of the coöperation shown by Mr. Thomas E. Dahill, Chief of the Saint Paul Police Department; Detective Lieutenant Frank J. Mondike, in charge of the check department, and his assistant, Detective George I. Hein.

Two Minnesota Physicians Lose Licenses to Practice Medicine

The Minnesota State Board of Medical Examiners at its meeting on May 8, 1934, revoked the license to practice medicine of Dr. Arthur W. Eckstein, who formerly practiced at Mankato, Minnesota. Dr. Eckstein's license was revoked following his conviction on March 31, 1934, of the crime of abortion. Dr. Eckstein is serving two years at hard labor in the State Prison at Stillwater.

At the same meeting the Board revoked the license of Dr. Milton G. Brown, who for the past year has maintained an office at Dakota, Winona County, Minnesota. Dr. Brown's license was revoked because of his habitual indulgence in the use of morphine. Dr. Brown had been before the Board on two previous occasions for the same offense.

In connection with these cases the Board wishes to state that, while it has no desire to be either arbitrary or vindictive, the laws of this State prohibit performing a criminal abortion and the Medical Act expressly provides that the performing of such an abortion by a physician and the use of narcotics by a physician are grounds for revocation of the license to practice medicine. It is the duty of the Board to protect, first of all, the welfare of the public, and the Board intends to fulfill that duty.

Spring Valley Woman Pleads Guilty to Violating Basic Science Law

State of Minnesota vs. Elizabeth Schulz

Elizabeth Schulz, forty-two years of age, entered a plea of guilty on May 9, 1934, before the Honorable Norman E. Peterson, Judge of the District Court at Albert Lea, to an information charging her with practicing healing without a Basic Science Certificate.

Mrs. Schulz, a farm woman living near Spring Valley, Minnesota, was arrested on January 11, 1934, following the death of nine year old Russell Prinsen, who had been under the care of Mrs. Schulz for about six weeks prior to his death. Russell had been ill for sometime with diabetes and had been under the care of physicians at Cresco, Iowa. In November, 1933, Russell was placed under the care of Mrs. Schulz and was given a so-called mineral food. This mineral food was analyzed at the University of Minnesota, and was found to be composed chiefly of sugar of milk. On January 8, when it appeared that Russell was becoming worse, Mrs. Schulz drove over to Austin, where she obtained a prescription from a physician for twenty units of insulin. She gave Russell two administrations of insulin, the first one of five units and the second one of four units. Russell died on January 10, 1934.

After hearing the facts, Judge Peterson sentenced Mrs. Schulz to a term of three months in the Fillmore County jail, which sentence was suspended and the defendant placed upon probation. Judge Peterson ordered Mrs. Schulz to report to him on June 4, 1934, at Preston. A similar charge against Mrs. Schulz was continued until that date. Before sentence was imposed, Senator Henry A. Larson of Preston, who represented Mrs. Schulz, presented to the Court a petition signed by about 1,800 persons, some "demanding" that Mrs. Schulz be permitted to practice, others testifying to the good work and good reputation of the defendant. Judge Peterson disposed of these petitions by remarking that a great many people signed petitions without knowing the facts; that it would be very easy to get people to sign a petition asking that he (Judge Peterson) be hanged.

Judge Peterson commented on the fact that the defendant had refrained from practicing since the time of her arrest in January. He advised Mrs. Schulz that the Basic Science Law was passed for a wholesome purpose; that sick people were very frequently taken advantage of by quacks; that she was not registered under the Basic Science Law and therefore had no

right to practice; that irrespective of the petitions in her behalf she could not be permitted to practice unless she had the necessary qualifications. Mrs. Schulz claims to have attended a school teaching some sort of suggestive therapeutics at Nevada, Missouri, in the summer of 1933; she stated that she attended that school for a period of four weeks; that the tuition fee was \$50.00, and that she received two or three diplomas. Outside of a short period of training as a student nurse twenty years ago, Mrs. Schulz has no medical education whatsoever.

Court Orders Hearing on Dissolution of the Northwest Hair Clinic, Incorporated

Following an investigation made by the Minnesota State Board of Medical Examiners into the incorporation of The Northwest Hair Clinic located at 109 South Ninth Street, Minneapolis, Minnesota, a petition for a voluntary dissolution of the corporation was filed by the stockholders in the District Court at Minneapolis on May 4, 1934. On May 7, 1934, the Honorable Arthur W. Selover, Judge of the District Court, signed an order setting June 4, 1934, as the date for the hearing of the petition to dissolve the corporation.

The Northwest Hair Clinic was incorporated originally as the Maison Bernard Cie, Incorporated, on September 16, 1932. The original incorporators were Bernard P. Sholton, Alyce Wendt and L. K. Schroeder. In July 1933, the name of the corporation was changed to The Northwest Hair Clinic Incorporated. The corporation among other things was organized to own and operate "beauty shops and hair and skin clinics."

This corporation was advertising a gland extract treatment for the growing of hair. They also advertised that the work was done under "strict medical supervision."

The corporate practice of medicine is not permitted in the State of Minnesota; neither are lay people permitted to practice medicine through the medium of employing a licensed physician. Dr. C. W. Wall, who holds a license to practice medicine in Minnesota, and who was a substantial stockholder in this corporation, was the medical director and conducted the actual business for the corporation.

CONTAMINATION OF FRUITS AND VEGETABLES WITH TOXIC INSECTICIDE SPRAY MATERIAL

The Committee on Foods reports that distributors of fruits and vegetables that may bear toxic spray material are obligated to remove such poisonous contaminations before they enter commerce for retailing to the public, or to warn food manufacturers of the possible presence of the spray residue. Food manufacturers using fruits and vegetables should take proper precautions either to assure the absence of toxic spray contaminations or their removal before the products are prepared or packed for consumption. Distributors of fresh fruits and vegetables and manufacturers of foods containing these products bear a serious responsibility to the public that their products as presented for consumption are entirely wholesome; carelessness or disregard of this public health responsibility is criminal. (Jour. A. M. A., October 21, 1933, p. 1316.)

OBITUARY

Dr. Earle R. Hare 1872-1934

Dr. Earle R. Hare, well known surgeon of Minneapolis, died at his home at the age of sixty-one, Monday, April 8, 1934, after a prolonged illness.

Born May 26, 1872, at Summerfield, Ohio, Dr. Hare took his bachelor's degree at Iowa Wesleyan College, Mount Pleasant, Iowa, and received his M.D. at the University of Minnesota in 1900.

Following his graduation Dr. Hare began practice in Minneapolis and taught anatomy for ten years in the Medical School at the University of Minnesota, after which he was on the surgical faculty of the school for seven years.

Dr. Hare had the distinction of having passed the State Board examination with the highest rank of any licentiate prior to 1900.

One of the organizers and charter members of the board of directors of the Exchange State Bank of Minneapolis and for years a member of the board of directors of the Marquette National Bank, Dr. Hare was also a director of the Marquette Securities Company which later became the Bank Shares Corporation.

Dr. Hare enjoyed a wide acquaintance in professional circles. He was an able speaker, versed in parliamentary procedure and for a period was active in the Minnesota State Medical Association, having served as treasurer for a number of years. He was a member of the Hennepin County Medical Society, the Minnesota State Medical Association and the American Medical Association.

Dr. Andrew J. Ames 1866-1934

Dr. Andrew J. Ames, sixty-eight years old, who had served several years on the examining board of veterans bureau No. 68 at Fort Snelling, died April 12, 1934, in Fargo, N. D., where he had been transferred the previous month by the veterans' administration. Dr. Ames suffered a stroke on April 1 that resulted in his death.

Born at Hutchinson, Minn., Dr. Ames came to Minneapolis as a boy and attended school there. He later was graduated from the University of Illinois medical college. After his graduation, Dr. Ames practiced medicine in Minneapolis until 1902. Then he served in Wheaton, Minn., for three years and in Forbes, N. D., for seventeen years.

In 1921 he was appointed to the examining board at veterans bureau No. 68, Fort Snelling. He also served three and one-half years at a Fargo hospital and three years in Chicago. A member of the Minneapolis consistory, Scottish Rite, Dr. Ames also belonged to Zuhrah temple of the Shrine. He was a member of the Elks Club, the Minneapolis Automobile Club and the Minneapolis Gun Club. In 1925 Dr. Ames was married to Sarah Appleton, who survives, in addition to a sister, Mrs. Florence Walker of Denver.

Dr. Harry Aldes 1884-1934

Dr. Harry Aldes died March 21, 1934, at the age of fifty-one years. Acute cholecystitis, complicated with acute pancreatitis and hepatitis, was the cause of death, terminating an illness of two weeks.

Dr. Aldes was born in Austria, coming to America during his boyhood. His early education was received in Saint Paul and his pre-medical training at the University of Minnesota. He graduated from the Univer-

sity of Illinois in 1911, having worked his way through college. His internship was taken at Bethesda Hospital, and he practiced in Saint Paul from 1912 until the time of his death. He was a member of the staff of Bethesda Hospital throughout his medical career, and manifested unswerving loyalty to the institution and his associates. He was a member of the Ramsey County Medical Society, the Minnesota State and American Medical Associations; a member of the out-patient staff of Ancker Hospital, as well as the medical staff of the Jewish Home for the Aged. He was a charter member of the Phi Delta Epsilon medical fraternity. He was an active member of the Osman Shrine Patrol, the Saint Paul Masonic Blue Lodge and the Order of B'nai Brith.

Dr. Aldes is survived by his wife, Mrs. Tillie Aldes, a son, Berthold, a daughter, Donna, and by his mother, three sisters and a brother. Funeral services were held March 22, 1934, with burial in the Sons of Abraham cemetery.

To the many friends who mourn his passing, the qualities which Dr. Aldes manifested particularly were good fellowship, unfailing loyalty to his associates, and a devotion to his family which has made his going most painful to his dear ones. An enthusiastic fisherman, with an inexhaustible fund of stories and a real sense of humor, he was especially liked by his male friends. His untimely death has created a real sense of loss to those whom he has left behind.

Dr. Lucius F. Foote

1852-1934

Dr. L. F. Foote, for twenty years a practicing physician in Minneapolis, died April 4, 1934, at the Hillcrest Hospital, at the age of eighty-one.

Dr. Foote was born at Janesville, Wisconsin, the son of Rev. Hiram Foote, a pioneer Congregational minister. He attended Carroll College and received his M.D. degree at Northwestern Medical College.

Dr. Foote was a prominent Mason and a member of the organized profession. He is survived by his widow and a sister, Miss Katherine Foote, Rockford, Illinois.

Dr. Carl Haas

1874-1934

Dr. Carl A. Haas, Saint Paul, died on January 22, 1934, at the age of sixty, following an illness of six months.

Born at New Ulm, Dr. Haas was a graduate of the University of Minnesota Medical School and began practice in Saint Paul, where he had been actively engaged in practice until about four years ago.

Dr. Haas is survived by his widow, Mrs. Gertrude Haas, two daughters and a son.

Dr. Otto Johnson

1875-1934

Dr. Otto F. Johnson, Saint Paul, died on January 8, 1934, at his home, 706 East Jessamine Street, following a long illness.

Graduated from Hamline University Medical School in 1901, Dr. Johnson practiced in Winthrop, Minnesota, for sixteen years. He was coroner of Sibley County for three terms and served for many years as chairman of the school board at Winthrop. He retired from practice in Saint Paul in 1919.

OF GENERAL INTEREST

Dr. Robert G. Hankerson, formerly of Elysian, Minnesota, has moved to Minnesota Lake, Minnesota, where he has established a practice.

Dr. Philip F. Donohue of Saint Paul announces the removal of his offices to 423 Lowry Medical Arts Building, Saint Paul, where he will continue his practice limited to urology.

Doctors Eugene S. Strout, John S. Macnic, W. E. Patterson and J. A. Watson moved their offices and that of the Eye, Ear, Nose and Throat Clinic from 74 South Eleventh Street to 1750 Medical Arts Building, Minneapolis, in May.

The Charles Lyman Greene Prize in Physiology, a cash prize of one hundred dollars offered yearly since 1929 by the Minnesota Society of Internal Medicine to an undergraduate in the University of Minnesota Medical School, has this year been awarded to Carroll J. Bellis.

The Minnesota Medical Alumni will hold their dinner meeting on the occasion of the American Medical Association meeting in Cleveland, in the Directoire room of the Carter Hotel, Cleveland, Wednesday, June 13, 1934. Dr. J. A. Myers will act as chairman of the Alumni meeting.

BULLETIN OF THE AMERICAN SOCIETY FOR THE CONTROL OF CANCER

A wide interest in the subject of cancer and its prevention has been manifest throughout the state. One way in which to keep in touch with what is being done in the nation-wide fight against the necessary incidence of cancer is to subscribe to the *Bulletin of the American Society for the Control of Cancer*.

The Bulletin contains numerous short articles of practical value written by distinguished authorities on the subject. The subscription price is only \$1.00 a year. A complimentary copy will be sent to any physician who sends such a request to the Society headquarters, 1250 Sixth Avenue, New York City.

EXTENSION COURSES

The attention of medical men throughout Minnesota is called to the fact that the State Medical Association Committee on Education and Hospitals, in coöperation with the General Extension Division of the University of Minnesota, and a faculty committee from the Medical School, has just issued a new bulletin announcing post-graduate lectures and clinics now available for county medical societies and similar organizations of physicians. The list has been thoroughly reorganized and revised, and the topics include a very wide field of study and discussion. The plan is to send out specialists in the different fields for series of from four to eight or ten lectures, coming once a week or twice a month during the season. Different men will come for each meeting and thus an interesting range of subjects will be included. Interested physicians are invited to write to the General Extension Division, University of Minnesota, for a copy of this new bulletin.

MEDICAL STUDY TRIP TO HUNGARY

At the invitation of the Hungarian Medical Post-graduate Committee of Budapest, Professor Emil de Grosz, President, and of the Association "Budapest Town of Medicinal Springs," Archduke Dr. Joseph

Francis, President, a medical study trip to Hungary is being organized. The plans provide for a fortnight visit to Hungary during which there will be post-graduate lectures and demonstrations in English at the principal University clinics and at the municipal thermal baths and springs. Reduced railroad fares and hotel rates are granted by the Hungarian Government. The party will sail from New York on August 18, 1934, visiting Munich and Oberammergau en route. The return trip may be made, optionally, via Berlin, Paris, or Italy, arriving back in New York on September 30.

American physicians of good standing are invited to join. The American Committee of the study trip consists of Harlow Brooks, M.D., Chairman, Charles G. Kerley, M.D., Jerome M. Lynch, M.D., Wendell C. Phillips, M.D., and Erwin Torok, M.D. Richard Kovacs, M.D., 1100 Park Ave., New York, is Secretary.

Heart Committee

Minnesota State Medical Association

THE INCREASING INCIDENCE OF CORONARY THROMBOSIS*

FREDRICK A. WILLIUS, M.D.

Rochester, Minnesota

Vital statistics and data from other sources call attention to the alarming increase in heart disease. Figures of the United States Census Bureau, for example, gave the death rate from heart disease as 132 per 100,000 population in 1900, whereas deaths from heart disease attained the startling rate of 186 per 100,000 population in 1925. Thus, the march of time witnesses the increasing slaughter of America's millions by heart disease, and in the vanguard of this malicious host is coronary disease which no longer respects certain age groups and is progressively depleting the ranks of younger persons.

Only twenty-two years have elapsed since Herrick made his now famous diagnosis of coronary thrombosis, the first recorded in the United States. Several years went by before the earnest students of medicine became cognizant of the condition, and the majority of members of the medical profession were not aware of the disease until many years later. Even today, in spite of the deluge of articles and monographs which has flooded medical literature, the disease still goes unrecognized.

It seems fitting again to call the attention of members of the medical profession to the alarming increase in coronary thrombosis and to the necessity for its prompt recognition. I can cite only the results of an analysis of available material, and I have chosen those cases occurring at The Mayo Clinic from 1922 to 1933, inclusive. Only occasional instances of coronary thrombosis were recorded prior to 1922, although the first clinical diagnosis of the disease at the clinic occurred in 1915.

I am aware of the fact that statistical studies dealing with the incidence of disease are not without errors, but I have attempted to minimize them in this study by comparing the actual number of cases of coronary thrombosis each year with the total registration of new patients.

Figure 1 vividly portrays the increase in the disease from an incidence of only 0.006 per cent in 1922 to an incidence of 0.300 per cent in 1933. The years of business adversity must be considered in this analysis as the drop in 1923 and the rather fixed incidence in

1930, 1931, and 1932 may have been influenced by the drop in registration. However, the incidence in the three years last mentioned probably reflects a greater absolute increase in the disease than is indicated in this figure. The enormous increase during 1933 is most significant and may represent the true beginning of an alarming situation which may be the result of influences from the preceding years of adversity.

White, in commenting on the increasing incidence of coronary disease, made the following statement: "My

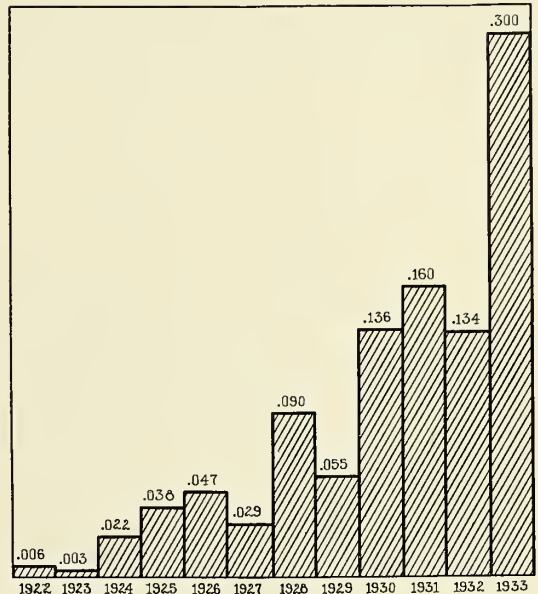


Fig. 1. Increase in incidence of coronary thrombosis at The Mayo Clinic for twelve years, per cent of first admissions.

own recent experience . . . has made me believe that the situation is appalling and demands some action on our part. Almost certainly the most effective move that we can make is to call a halt on the world's mad rush of today."

One of the disconcerting facts regarding the present situation is the increasing incidence of the disease among younger persons. It is now extremely common among persons in the fifth decade of life, it is appearing with alarming frequency among those in the fourth decade, and it occasionally is observed among those in the third.

When the incidence of any disease is on the upturn, its manifestations may be expected to become increasingly atypical. This condition exists today, and cases of coronary thrombosis are constantly being observed that in most respects depart widely from the classic description of the disease. Members of the medical profession must acquaint themselves with these facts in order to permit early recognition and to be in the position to give proper advice to the patient. Only too often the patient is said to have "acute indigestion," and his physician permits him to return to his work after the pain of the attack has subsided. If treatment has any value whatsoever in this disease, absolute rest during the first five or six weeks largely determines the patient's chances for survival.

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2. White, P. D.: *Heart disease*. New York, The Macmillan Co., 1931, p. 609.

*From the Section on Cardiology, The Mayo Clinic, Rochester, Minnesota.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MEDICAL BROADCAST FOR THE MONTH

The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 10:30 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of June will be as follows:

June 6—Some Herat Disease Problems.

June 13—Care of Crippled Children.

June 20—Conjunctivitis.

June 27—Cancer of Stomach.

THE STATE ASSOCIATION MEETING

Members of the Minnesota State Medical Association will have the opportunity of hearing the following out-of-state visitors at the annual meeting to be held in Duluth July 16, 17 and 18, 1934: Dr. Walter Biering, Des Moines, Iowa, president of the American Medical Association; Dr. A. B. Moore, Professor of Roentgenology at Georgetown University, Washington, D. C., and first lecturer for the Russell D. Carman Lectureship newly established by the Minnesota Radiological Society; Dr. C. C. Little, New York City, executive secretary of the American Society for the Control of Cancer.

The Scientific Demonstration and Exhibit section of the state meeting is to be the most extensive ever attempted at our meetings. It covers a variety of subjects of immediate, practical interest to the profession and falls in with the newer trend in medical meetings, which everywhere is toward the small group units. In order to give members some idea of the exhibits to be presented, the following partial list is appended:

Carbon Monoxide Poisoning—F. J. Elias, Duluth
Cosmetics Having a Health Hazard—A. J. Cramp, Chicago

Emergency Treatment of Fractures of the Femur—Clarence Jacobson, Chisholm

Treatment of Fractures—Orthopedic Club, Duluth

Ambulant Treatment of Hernia—A. F. Bratrud, Minneapolis

Autobiography of Mandible—A. H. Fee, Duluth

Pathology of Amebiasis—T. B. Magath, Rochester

Arteriography—E. V. Allen and J. D. Camp, Rochester
Blood Dyscrasias—F. J. Heck, Rochester

Types of Diffuse Arterial Disease with Hypertension—N. M. Keith, H. P. Wagener and N. W. Baker, Rochester.

Neurologic Diagnosis and Surgery—A. W. Adson et al, Rochester

Physical Therapy—M. E. Knapp, Minneapolis

Pneumonitis Produced by Fungus Spores—J. W. Towey, Powers, Mich.

Pulmonary Carcinoma—F. F. Callahan, Pokegama

Occupational Dermatoses—Louis Schwartz, New York
Epidemic Encephalitis—U. S. P. H. S.

Lead Poisoning and Silicosis—R. R. Sayers, Washington, D. C.

Trichinosis—W. A. Riley, Minneapolis

Tularemia—R. G. Green, Minneapolis

Experimental Study of Visceral Pain—E. A. Boyden and L. G. Rigler, Minneapolis

Contagious Diseases—E. S. Platou, Minneapolis

Artificial Respiration—J. S. Lundy, Rochester

Injection of Varicose Veins—M. G. Gillespie, Duluth

In addition, numerous committees of the State Medical Association will present exhibits.

Members are urged to make hotel reservations for the Duluth meeting in advance. These may be made direct, or through Dr. A. O. Swenson, 1510 Grand Avenue, Duluth, chairman of the local Committee on Hotel Reservations.

A record attendance at the Duluth meeting is expected.

AMERICAN MEDICAL ASSOCIATION MEETING

The eighty-fifth annual session of the American Medical Association will be held in Cleveland, June 11-15, 1934.

The House of Delegates will convene at 10 A. M. Monday, June 11, in the Ball Room of the Hotel Statler. Minnesota will be represented by Drs. H. M. Johnson, W. F. Braasch and J. T. Christison. Delegates from the scientific sections include Dr. N. M. Keith, Pharmacology and Therapeutics, and Dr. Henry W. Meyerding, Orthopedic Surgery.

Headquarters will be at the Cleveland Auditorium and the scientific sections will meet in the various halls of the auditorium. The scientific exhibit will be displayed on the Arena Floor of the same magnificent building.

Of interest to many members will be the annual golf tournament of the American Medical Golfing Association set for Monday, June 11, at the Mayfield Country Club. The Will Walter trophy will be awarded for the low gross thirty-six holes. Some fifty prizes will be awarded in all. All Fellows are eligible and those interested should communicate with Bill Burns, 4421 Woodward Avenue, Detroit, Michigan.

AMERICAN PROCTOLOGIC SOCIETY

The thirty-fifth annual meeting of the American Proctologic Society will be held in Cleveland, Monday and Tuesday, June 11 and 12, 1934, in connection with the meeting of the American Medical Association. Scientific sessions will occupy the two days with the annual dinner Tuesday evening. Headquarters will be at the Hotel Cleveland. Dr. Frank G. Runeyon, 1361 Perkiomen Avenue, Reading, Pa., is secretary of the organization.

NEW YORK ACADEMY OF MEDICINE

1934 Graduate Fortnight

The Seventh Annual Graduate Fortnight of The New York Academy of Medicine will be devoted to a consideration of Gastrointestinal Diseases. The Fortnight will be held October 22 to November 2, 1934.

Sixteen important hospitals of the city will present coordinated afternoon clinics and clinical demonstrations. At the evening meetings prominent clinicians from various parts of the country who are recognized authorities in their special lines of work will discuss the various aspects of the general subject.

A comprehensive exhibit of anatomical, bacteriological and pathological specimens and research material will be shown. Many of the exhibits will be demonstrated.

The profession generally is invited to attend.

A complete program and registration blank may be secured by addressing Dr. Frederick P. Reynolds, The New York Academy of Medicine, 2 East 103d Street, New York City.
May 10, 1934.

HENNEPIN COUNTY SOCIETY

At the regular meeting of the Hennepin County Medical Society on Monday evening, May 7, 1934, the results of the election were announced as follows: President, Dr. J. M. Hayes; first vice president, Dr. W. H. Aurand; second vice president, Dr. J. H. Simons.

Dr. Moses Barron and Dr. Gilbert Cottam were elected to serve on the Executive Committee; Dr. W. E. Camp and Dr. C. R. Drake, Board of Censors; Dr. A. S. Hamilton and Dr. E. W. Hansen, Board of Trustees; Dr. Oscar Owre and Dr. C. A. Stewart, Ethics Committee.

Delegates to the State Convention are: Drs. C. A. Stewart, D. P. Head, E. K. Green and E. S. Platou; alternates, Drs. F. G. Benn, R. F. McGandy, G. T. Nordin and F. A. Olson.

NORTHERN MINNESOTA MEDICAL ASSOCIATION

The Northern Minnesota Medical Association will hold its annual meeting September 10 and 11, 1934, at Brainerd. Dr. F. J. Hirschboeck is chairman of the Program Committee.

SOUTHERN MINNESOTA MEDICAL ASSOCIATION

The annual meeting of the Southern Minnesota Medical Association will be held in Mankato, Minnesota, Monday, August 13, 1934, in an all-day session.

The first hour of the day from 8 to 9 A. M. will be devoted to demonstrations by local physicians and the remainder of the morning to a discussion of symptoms with addresses and pre-arranged discussions.

The business meeting will be held in connection with luncheon and the afternoon session will consist of scientific papers. Special stress will be laid on the presentation of case reports and a medal will be presented by the committee on case reports for the best presentation.

The annual banquet will be held at 6 P. M., to be followed by addresses.

Dr. Porter P. Vinson is chairman of the Program Committee and communications regarding the program may be addressed to him in care of The Mayo Clinic, Rochester, Minnesota.

SOUTHWESTERN MINNESOTA SOCIETY

The Southwestern Minnesota Medical Society held two medical meetings at Fulda.

On April 30, 1934, a short business meeting was held. Dr. L. M. Randall, Rochester, lectured on "Endocrinology as It Applies to the Gynecological Patient." Dr. E. H. Ryncarson, Rochester, lectured on "Diabetes."

On May 7, 1934, Dr. Philip S. Hench, Rochester, lectured on "Arthritis." Dr. L. E. Prickman, Rochester, lectured on "Hay Fever—Treatment and Results of Extra-mural Treatment, or Pollen Fever and Vasomotor Rhinitis."

WASHINGTON COUNTY SOCIETY

Frank Savage, M.D., president of the Minnesota State Medical Association, in his presidential letter which appeared in the March number of MINNESOTA MEDICINE, deplored the fact that the death rate from tuberculosis in girls between the ages of sixteen and twenty-two has not been lowered. Dr. Savage's letter is very timely and pertinent. It is to be hoped that all county societies will take this matter up and do all they can to fight this dreadful disease by educating these young people not only in the state of Minnesota but all over the United States.

Acting on this, the Washington County Medical Society started an educational campaign sponsored by the Minnesota State Public Health Association to engage

the coöperation of these girls in an effort to reduce the incidence of this disease in this age group.

William O'Brien, M.D., associate professor of pathology at the University of Minnesota, started this campaign by lecturing to the Stillwater high school girls recently. The doctor emphasized several points. As there is no place like home, love for home should be cultivated, as these girls some time or another will be the principal members of homes of their own. The home should not be regarded as a place to go when no other place is available. In advocating no freak diets he urged his hearers to keep up their weight and have well balanced and nutritious meals. He further advised healthful out-of-doors exercise, plenty of rest and sleep, and absolutely no alcohol in any form. Young people do not need alcohol and many irreparable disasters have occurred from its use by the young.

E. SYDNEY BOLEY, M.D., *Secretary.*

WOMAN'S AUXILIARY

President—Mrs. A. A. PASSER, Olivia
Chairman Press and Publicity—Mrs. GLEN R. MATCHAN,
Minneapolis
Editor—Mrs. S. H. BAXTER, Minneapolis

Dr. W. C. Bierring, Des Moines, president of the American Medical Association, will head the list of speakers for the twelfth annual convention of the Woman's Auxiliary to the Minnesota State Medical Association which will be held in Duluth July 16, 17 and 18. Other speakers on the program include Mrs. James Blake, past president of the National Auxiliary, and Dr. A. J. Cramp of Chicago, director of the Bureau of Investigation, American Medical Association, who will speak on "Mrs. Gullible's Travels in Cosmetic Land." The members of the Advisory Council, Dr. E. A. Meyerding and Dr. L. R. Critchfield of Saint Paul and Dr. C. B. Wright of Minneapolis, will be heard at the luncheon meeting Tuesday, July 17.

For entertainment of the visiting women there will be a boat ride on the steamer Montauk on Monday afternoon up the St. Louis River to be followed by a joint meeting with the Medical Association that evening. On Tuesday afternoon, July 17, following the luncheon an automobile ride and a garden tea party are planned to be followed by a joint banquet with the Minnesota State Medical Association at the Hotel Duluth.

The annual meeting and luncheon will take place on Wednesday, July 18, at the Kitchi Gammi Club with Dr. A. J. Cramp as speaker.

All doctors' wives and families are cordially invited to all sessions, both business and social. Registration will be at the Hotel Duluth; with Mrs. B. F. Davis of Duluth in charge. The St. Louis County Auxiliary, headed by the president, Mrs. Anthony J. Bianco, has planned to make our three-day meeting in Duluth a memorable occasion.

CAMP RELEASE AUXILIARY

A meeting was held at the Masonic Hall, at Dawson, April 26, 1934, with the president, Mrs. J. J. Dordal, in the chair. Officers elected for the ensuing year are as follows: President, Mrs. Herman Johnson, Dawson; vice president, Mrs. Sanderson, Granite Falls; secretary and treasurer, Mrs. H. T. Sherman, Bellingham.

HENNEPIN COUNTY AUXILIARY

At the annual meeting of the Hennepin County Auxiliary the following officers were elected for the ensuing year: President, Mrs. Gustaf T. Nordin;

president-elect, Mrs. Glenn Matchan; first vice president, Mrs. W. W. Moir, recording secretary, Mrs. H. W. Quist; corresponding secretary, Mrs. C. A. McKinlay; treasurer, Mrs. F. S. McKinney; auditor, Mrs. J. M. Hall; custodian, Mrs. C. A. Boreen.

KANDIYOHI-SWIFT-MEEKER AUXILIARY

A meeting was held at the Lakeland Hotel, in Willmar, April 19, 1934. Meeker County Auxiliary joined the Kandiyohi-Swift group at this time to conform to the recent change in the Medical Society. The following officers were elected: President, Mrs. C. L. Scofield, Benson; vice president, Mrs. H. E. Wilmot, Litchfield; secretary, Mrs. B. F. Smith, Willmar; treasurer, Mrs. W. J. Doswell, Kerkhoven.

Mrs. Scofield presided at the business session following the dinner and Mrs. A. A. Passer was guest speaker.

MOWER COUNTY AUXILIARY

Members of the Mower County Auxiliary held their annual meeting, March 26, 1934, at the Y.W.C.A. in Austin. Officers for the ensuing year were elected as follows: President, Mrs. G. E. Hertel; vice president, Mrs. L. G. Flanagan; secretary, Mrs. R. S. Hegge; treasurer, Mrs. Paul Leck, all of Austin.

During the year twelve layettes were made and given out and baskets given to needy families.

OLMSTED-HOUSTON-FILLMORE-DODGE COUNTIES AUXILIARY

Future plans for meetings of the Woman's Auxiliary to Olmsted-Houston-Fillmore-Dodge County Medical Society will be made by a committee consisting of Mrs. L. M. Randall, Rochester, chairman; Mrs. J. A. Mallerich, Caledonia; Mrs. C. E. Bigelow, Dodge Center; Mrs. C. B. McKaig, Pine Island; Mrs. George Edwards, Canton; Mrs. Oscar C. Heyerdale, Rochester.

Appointment of the committee was announced at a meeting held in conjunction with the Medical Society April 25, 1934.

The Auxiliary reelected the officers just completing the year: President, Mrs. Fred P. Moersch, Rochester; vice president, Mrs. George Eusterman, Rochester; secretary, Mrs. F. C. Dolder, Eyota.

RENNVILLE COUNTY AUXILIARY

Renville County Auxiliary was organized at a meeting held at the home of Mrs. A. A. Passer of Olivia, on Tuesday, May 1, 1934, as an auxiliary to the newly formed Renville County Medical Society. The members were former members of Camp Release Auxiliary. Officers elected are as follows: President, Mrs. J. J. Dordal, Sacred Heart; vice president, Mrs. R. S. Madland, Fairfax; secretary and treasurer, Mrs. G. H. Mesker, Olivia.

TRANSACTIONS *of the* MINNEAPOLIS SURGICAL SOCIETY

STATED MEETING HELD MARCH 1, 1934

The President, DR. KENNETH BULKLEY, in the Chair

WHO ARE THE PEOPLE IN THE BREADLINE?

C. M. ROAN, M.D.*

Coming directly from the dinner meeting of the Athletic Club where we were told by Professor Thomas how to prepare a manuscript and how to appear before an audience, I hesitate to speak and that for obvious reasons. This is not a paper, it is only an impromptu presentation.

First, I wish to tell you how I happened to deviate from the straight and narrow path of the practice of medicine. Some of you may have wondered why. I had paid no attention to local government, or government of any kind, until 1925, when, by an accident, as it were, I was thrust into public life. It was a rainy afternoon when a number of cars, including mine, collided on Superior Boulevard. Dr. Hugo Hartig, who rode with me, never knew what struck him, as he died instantly. Mayor Leach asked me to take Dr. Hartig's place on the Board of Public Welfare, which I did. There were no problems then as there are now, but nevertheless I believe I rendered a valuable service.

You may remember how all things were prepared to move the General Hospital to the University Campus. I could not see it that way, and the result was that the General Hospital was not moved. The deal would have cost the city seven million dollars, and, furthermore, it probably would have resulted in the loss of the management of the hospital. Many members of the profession were against me at the time, but I have reason to believe now that they have changed their opinion.

In discussing my topic I shall be brief, for I realize there are more interesting matters to come before this meeting. The subject is not entirely foreign to surgery

because the present unemployment situation is affecting professional men very seriously. I might say that I would like to see medical men take more interest in civic affairs. The present situation in our city, and in the country at large, calls for men who are willing to go to the front, willing to speak their minds, and willing to stand for a principle. That question, however, is too big for me to discuss now.

Who are the people in the breadline? To begin with, I will tell you of my experience today. Members of the Board of Public Welfare are not supposed to be seen by people who are in need, but I will not criticize them for coming, nor perhaps would you. (May I intermit that all appointive members of the Board serve without pay.) The law requires that those who are in need must make application themselves at the agencies established for this purpose, but it is hard to go alone when the direction is towards the public breadline. With all the energy you may have, your knees would falter also if you were compelled to seek public aid.

As I walked into my office this morning a civil engineer was waiting for me, and if I were to mention his name all of you no doubt would know him—a graduate of our university in the class of 1910. As a professional man he carried on his work successfully in our city for a number of years, whereupon he moved away and was gone long enough to lose his rights as a local citizen. The law requires one year's residence before public aid can be given. This man was in dire need, and he sought my aid after having been turned down by the investigators.

This afternoon a woman came into my office asking me to intercede for her. She is a scrubwoman in one of the downtown buildings, supporting a family of

*Member of the Minneapolis Board of Public Welfare.

seven children. Several of her children are grown-up, three of the boys being able and willing to work but cannot find employment, and here this poor mother, scrubbing floors for only \$40.00 a month, is trying to support her large family, which effort of course is utterly impossible on that wage. In normal times such a family would never think of seeking public aid.

A third person also came to see me this afternoon, a widow. I knew her husband when he was considered to be a very wealthy man. I believe, he was worth at least \$50,000; all his money I am told was invested in farm mortgages. Today, after his death several years ago, his widow is down and out and must have public aid, as she has not been able to realize on her husband's investments. She wept as she feared the thought of the breadline.

There are three classes of people in the breadline. The first is the chronic class which always will be on public charity. Fortunately, they constitute a very small percentage of those in the line now, perhaps not over 1 per cent.

The second class is constituted of those people for whom things go wrong in the best of times due to illness, bad investments, hard luck of one kind or another, but fortunately in good times their distress is of short duration.

If you have not already seen the breadline in our city, I trust you all will attempt to do so. You will have answered for yourself the question as to who the people are who are getting public relief. You will see your friends, your neighbors, and your patients there. It will do you good to see what is going on in our midst.

One of my doctor friends asked me recently about the substation at Bloomington Avenue and Lake Street, saying: "Doctor, why did the Board of Public Welfare locate a substation out here?" He said he could not sleep the first night after seeing that line. Even though he could not sleep he will benefit from seeing what his fellow citizens are up against.

The third class of people in the breadline consist of our best citizens who by reason of circumstances over which they have had no control have been compelled to seek public aid.

My private waiting room is frequently filled with people I have known for years, all asking me to intercede for them at the City Hall. Sometimes I nearly give up under the strain, for it is distressing to see people one never thought would need public aid, coming to the breadline. When I say we have the best of our people in the breadline in Minneapolis you probably will not believe me. Among others there are efficiency experts, ex-bankers, graduate nurses, physicians, dentists, and attorneys in the line. A week ago the Civil Service Commission conducted an examination for social service investigators in Class B, which can be taken by anyone having a high school education, and, of the 300 persons who took the examination, I am told a large number were attorneys. This situation illustrates present conditions. Class A can only be taken by persons who have completed a course in Sociology at the University. Last week I helped place in the breadline one of our very able dentists. Undoubtedly you would all know him if his name were mentioned.

Let me review briefly what has been done and what constitutes our greatest problem at the present time: Last year the relief budget amounted to approximately \$4,000,000. The budget was raised as follows: \$2,700,000 by the sale of relief bonds; \$1,379,000 provided by the federal government, and about \$80,000 from tax levies. This year the estimated budget will run in excess of \$4,000,000. We are asking the federal government for a grant of \$2,700,000 and the Board of Estimate and Taxation for the sale of \$1,500,000 of relief bonds. In addition there are about \$60,000 from tax levies that will go into the budget. In 1929 the budget requirements of the relief department amounted only to \$172,000. From this you can see for yourself what has happened over a period of five years—all due to unemployment.

Ninety-eight per cent of the men and women in the bread line are willing to work. A few years ago the situation was quite different. The tables have been turned. I recall during the World War we wanted to employ a maid in our home. We tried every possible agency for a white girl, but could not get one, so one Sunday evening I drove to a church for colored people hoping I could find some one there who would be willing to work for good pay, but no. That was the condition some years ago.

When the CWA projects were started in Minneapolis the federal government requested the Board of Public Welfare to place 6,500 family men to work. We had, at the time, about 13,000 family heads on our lists. The other 50 per cent were to be taken from the registered unemployed at the federal agency. There were 40,000 men registered there, so that the 6,500 men taken for the first allotment left many who had expected to be given something to do disappointed and despondent.

Of the many things President Roosevelt has done, the CWA was the first real thing the President did for the average citizen. You possibly cannot understand what it means to be without any earnings, or income, for any length of time. When I was a young practitioner and had taken in only a few dollars during the week, I know how I felt when Saturday night came along. After two or three years have gone by without earning a penny, men who used to provide well for their families, always meeting their obligations, have difficulty under present conditions to maintain their morale, and no one can blame them. Never have I seen such happiness as evidenced by the men over the little money they were able to earn on CWA projects during the last few months. One man came to me saying: "Doctor, look at me and see what I have now. Look at my overcoat, my suit, my shoes, and my hat! I have not had a decent piece of clothing for three years, look at me again."

To the more than four thousand homeless, single men in the gateway we cannot say, "Go out and get something to do." This would be absurd because there are no real jobs to be had. I remember well the depression of the nineties. I was a boy, living on a farm which my father owned, and besides, being a Civil War Veteran, he had a small pension, so we suffered nothing. The question is frequently raised now, "Why don't you send these men out and make them go to work as it was done in '94?" If you stop to think what the population of the United States was in '94 and compare it with the population today, you will see that there is a vast difference. Then, there were 70,000,000 people, and today there are 122,000,000. In other words, there are 52,000,000 more than in '94. While it was very difficult to obtain a little employment then, it is well-nigh impossible now. The machine has taken jobs away from our people.

Whatever measure of prosperity will return under the New Deal, there will in my opinion always be a large number of men in our country who will not be able to find employment—probably from four to eight million men, and they will constitute a grave problem.

Today we have as many families in the breadline as we had last fall before the CWA projects were started. Shortly afterwards the number dropped but new families came in—families who had held out until the last moment, using up every possible resource, borrowing on their life insurance, borrowing from friends, and moving together, but who are now compelled to seek public aid. As spring arrives it is hoped conditions will improve.

So far the city's credit has been good. However, if within eighteen months or two years from now conditions have not improved, Minneapolis in my opinion will be unable to maintain her credit and what the situation then will be I hesitate to prophesy.

I trust, men, that you will think rationally about those of our citizens who are compelled to be in the bread-

line, and that you yourself will be thankful for whatever means of livelihood you may possess.

SKIN GRAFT BY SEED IMPLANTATION

H. O. MCPHEETERS, M.D.

I realize full well that it is indeed a presumption on my part to suppose for a moment that I could tell this group anything on the subject of skin grafting. This is such a common operative procedure and apparently one so easily carried out that a discussion of it may seem needless. Yet, we often find that the most simple and useful things are not fully appreciated and that any technic, regardless of how perfect, may be improved upon. As I studied the subject I realized how little I knew about it and I feel a brief review will not hurt us. It is with this thought in mind that I have the temerity to take your time.

There are many different types of grafts and for each there is a definite use and indication. I believe that the best and most simple classification is that of Davis. He divides them into the thin (the true Reverdin, the Ollier-Thiersch and the Seed Implants of Braün); the thick (the small deep graft of Davis, the Wolfe-Krause graft, the Blair full thickness graft); the pedicled flap; and the tube graft. It would be best if all these grafts were spoken of according to the Davis anatomical classification and not by the name of the surgeon having his name attached to it.

The skin consists of three main layers, the epidermis, the dermis or true skin, and the hypodermis or subcutaneous layer. The epidermis has several layers, the chief of which are the stratum corneum or outer layer of cornified epithelium, the stratum germinativum or basal layer of nucleated columnar cells implanted by denticulated edges on the basement membrane of the corium. It is principally from the cells of the germinal layer that the new skin develops. The dermis or true skin is divided into the stratum papillare, containing the papillae jutting upward into the germinal layer and carrying the terminal buds of nerves and vessels and sebaceous glands, and the stratum reticulare, which carries the main vessels and nerves supplying the skin and the hair follicles with some glands. The hypodermis or subcutaneous layer contains mostly fatty tissue carrying the sweat glands, the blood vessels, nerves and hair roots or papillae.

The thin grafts are taken down through the germinal layer but should not be deep enough to cause bleeding, rather only a serous oozing, and should contain no fat, while the pedicled flap and tube grafts take all the layers, the fat included.

Wet saline packs are usually kept on for several days. With either the Reverdin or the Thiersch graft much care must be used in changing the dressings to avoid pulling off the recently applied grafts not yet firmly adhered. Neither of these grafts can be used with any degree of success if there be much infection present.

The Thiersch and the Ollier-Thiersch grafts are the ones most commonly used. They are usually 2 to 3 cm. wide and 10 to 12 cm. long. For their use the bed must be carefully prepared, there must be no infection present, the parts must be kept immobilized and the post-operative care is very important in securing a good result. For small areas 4 to 6 inches square they are perhaps the best. The Reverdin graft is a pinch graft made by nipping off small bits of skin 5 to 10 mm. in diameter, with a sharp scissors. They are simply planted about over the granulating area. The part must be immobilized and pressure applied to keep the grafts in close contact with the vascular granulations.

It is particularly the thin graft taken and cut into small bits and implanted after the method of Braün that I will discuss at this time. This graft is really a modification of the thin Reverdin or Thiersch grafts. It was first suggested by Dr. Wilhelm Braün of the Friedrichshain Hospital in Berlin, in 1920. But very little has been written on or about it and the only

article of any importance in the American Press was by Dr. O. W. Wangenstein in the publication, *Surgery, Gynecology and Obstetrics*, for March, 1930. The injection of macerated skin with a syringe directly into the granulation tissue as suggested by Mangoldt is similar in theory to the Braün idea, yet not so efficient.

The seed grafts are best taken by picking up the skin on a needle point and then cutting under it with a real sharp scissors or scalpel. Davis emphasized the effect of trauma in cutting the graft as a potent factor in causing its death. In taking his "small deep grafts" he insists on the use of the scalpel and no scissors. I believe that with sharp scissors this danger is of little consequence. The graft removed should be cut into small bits 2 to 4 mm. square or about one-half the size of a grain of wheat. These small bits of skin are then implanted deep into the granulations as shown by the illustration. When thus implanted they are not washed off by the exuding serum or torn off when the dressings are changed. They are continually bathed in the serum and the blood of the living granulation tissue instead of being merely held firmly against it by pressure as with the other grafts. It matters not which side of the graft is up. The grafts should be implanted about 1 to 1.5 cm. apart. The granulation bed does not have to be sterile as with the other grafts. On the contrary, they can be placed in any ulcer bathed in pus. The postoperative care is the same as before the implantation. If the case is bed-ridden, then the best results are obtained by continuing warm saline packs for the first few days, alternating with para-theo-eresol solution as wet packs for forty-eight hours at a time. If the granulations are too exuberant, then apply adhesive strapping firmly over the entire wound for three to four days. If the case is ambulatory apply any ointment dressing to protect the granulations and change as before. The use of the para-theo-eresol ointment under the trade name of Ointment Sulphen "McNeil" is of definite value. This ointment also toughens and thickens the skin after healing.

Just as all the other methods have their shortcomings so do the "seed implants." They should not be used on the exposed parts, as the face, arms, etc., for cosmetic reasons. As the grafts grow they are uneven in height and seem to form islands, and the areas between them retain their redness for a long time. The skin seems to be more tender and it is slower in becoming firm and tough. Naturally, it is more easily lacerated and bruised. On the dependent extremity the grafted area should have support for a long time, as with the Ace bandage, Unnas cast or elastic stocking.

This method not only shortens the healing time of any large ulcer, varicose, traumatic or otherwise, but it rapidly covers over the granulating area and thus prevents extensive scar formation with its resultant contraction and deformities. If, in the individual case, the result is not satisfactory, resection of the healed area can easily be done and a full thickness flap be applied.

In conclusion, I present the Braün method of seed implantation not as the "ideal" but as one which I believe is not used to the fullest extent of its possibilities. I believe it should be used more in the extensive burns and granulating areas seen in industrial surgery and practice. It certainly will shorten the healing time of any wound and thus lessen the pain of repeated dressings. It can be used when other methods cannot. The exact method of implanting the seeds by using the point of the hypodermic needle instead of the head of the skin needle I believe is original and an improvement in the technic as used in the past.

DISCUSSION

DR. JAMES A. JOHNSON: In performing skin grafting it is well to keep in mind the general condition of the patient. A few years ago I undertook the skin graft of an extensive burn. Repeatedly the grafts failed to take. I was unable to explain this, but after investigation I found that the general condition of the patient

was very poor, the hemoglobin and red blood count being low. After several transfusions, together with sunlight and consequent improvement in general health, the skin grafts grew without any further difficulty.



Fig. 1 (upper left): The dark ring outlines the size of the original varicose ulcer. Five of the six seed implants are shown as islands of new skin ten days old.

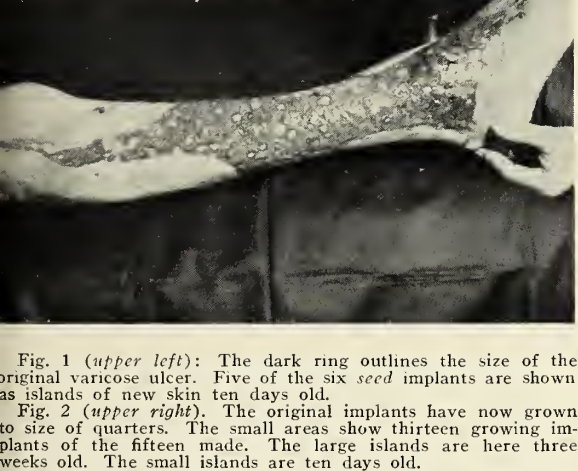


Fig. 3 (below). Extensive case of skin and fascia destruction following injury. Two hundred and ten seed implants were made and 165 took. The implants here were twelve days old.

DR. J. F. CORBETT: I notice that the essayist, in referring to pinch grafts, minimizes the importance of infection. However, infection is an undesirable thing. I yet believe, in order to get a comparatively clean surface, various agencies are tried on a large number of cases at the Rockefeller Institute and they find the best way to get these surfaces reasonably sterile is by the use of soap and water, and that the percentage of "takes" were much better when they did go through this preliminary cleansing than when that was not done.

DR. GEORGE R. DUNN: I would like to ask Dr. McPheeters if he has had any difficulty in the granulations overgrowing the implanted grafts,—the grafts becoming buried in the granulation tissue.

DR. THEODORE SWEETSER: I might make one remark. We had a patient who was injured in an automobile accident in the East. A full thickness graft was put on down there and the patient later returned to Minneapolis. We used this implant graft method on the part that had not healed. I was surprised to see that the general cosmetic result was better where the im-

plant grafts were used than where the full thickness graft was placed.

DR. H. O. MCPHEETERS: In reply to Dr. Corbett's inquiry I will say that the presence of much infection spells failure for the Thiersch, Reverdin and full thickness grafts. It seems to be of little consequence when the seed graft is used. Healthy granulations are needed and one surgeon has suggested that the grafts seem to take better in the presence of infection.

The rapid overgrowth of the granulations is best controlled by adhesive strapping directly over the wound. They should be put on tightly so as to give pressure.

Under the theo-cresol stimulation the low areas between the islands seem to fill out and the skin becomes quite level and smooth.

EXOPHTHALMIC GOITER VERSUS TOXIC ADENOMA

CLINICAL AND PATHOLOGIC DIFFERENTIAL FEATURES

CARL O. RICE, M.D.

A discussion of the differentiation between exophthalmic goiter and toxic adenoma can always be stimulated between students of thyroid problems. It is intended to point out in this paper a few of the differential features which make these closely allied diseases appear to be two distinct clinical and pathologic entities.

In order to understand this problem it is necessary to revert to a review of the study of the normal thyroid gland with its numerous variations in the individual. It has been observed that the thyroid gland develops a definite sequence of histologic changes during its growth in the normal individual, which probably represent its response to physiologic stimuli as it passes through the numerous strains and stresses of life.

At infancy the thyroid gland weighs approximately 1.5 grams. As the child develops, there is a rapid increase in the weight of gland, which reaches its maximum, averaging 30 grams, during early adult life. Following this there is a gradual decrease in the weight of the gland as the individual passes into old age. The normal range of variability may be from 10 to 50 grams.

Associated with this there is a change in the size of the acini from the small, closely packed, colloid-free acini of infancy to the large colloid-filled acini of puberty and early adult life, and again a decrease in their size with the decrease in the weight of the gland and advancing years. The range of normal variability in the size of the acini may be found to extend from 50 to 400 microns in the adult.

The acinar epithelial cells change with the size of the acini. The small acini of infancy are composed of cuboidal cells. As the acini increase in size the epithelial cells become lower. They may even become flat.

Coincident with these histologic changes through the life cycle of the thyroid gland there is the development of nodules in a certain percentage of individuals. This incidence of nodules increases directly in proportion to the age of the individual so that in old age approximately 100 per cent of thyroid glands contain nodules within their structure. These nodules may be colloid, parenchymatous, mixed or degenerate or any combination of these. Roughly, it may be stated that the incidence of nodules can be represented by the same figure as the age of the individual, i.e., approximately 30 per cent of the individuals at thirty years of age will be found to have nodules in their thyroid glands.

From this preliminary review of the normal thyroid it can be seen that the thyroid gland may have an extremely variable structure and still be physiologically normal. Keeping these facts in mind it will be possible to more readily understand the pathology of the diseased thyroid.

Patients with exophthalmic goiter and toxic adenoma of the thyroid present many clinical signs and symp-

toms common to both diseases. A typical history reveals that both suffer from nervousness, weight loss, dyspnea on exertion, tachycardia, tremor, hyperhidrosis and a goiter. These are the cardinal symptoms of hyperthyroidism and with the exception of the goiter all these symptoms can be reproduced by the administra-

tion of the diagnosis but like other signs is not always present. It has often been said that exophthalmos occurs in a small percentage of toxic adenoma (3 to 10 per cent). Those cases showing exophthalmos which have been diagnosed clinically as toxic adenoma, in all probability, have been incorrectly diagnosed or the presence

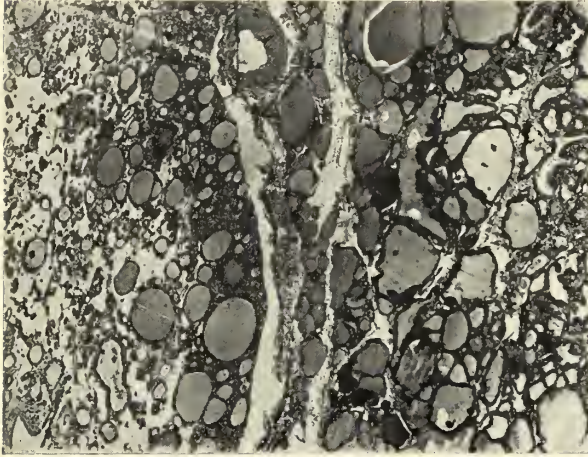


Fig. 1. Microphotograph. Mr. D. McR., aged sixty-one. Weight of gland 31 gms. Hyperthyroid symptoms one year. Exophthalmos; bruit. B.M.R. plus 43. Iodine given 24 days preoperatively. Nodule palpable clinically. Section shows fetal adenoma on the left with a few large colloid acini. Acini adjacent to the nodule show atrophic changes. Tissue on the right side shows hypertrophy and hyperplasia.

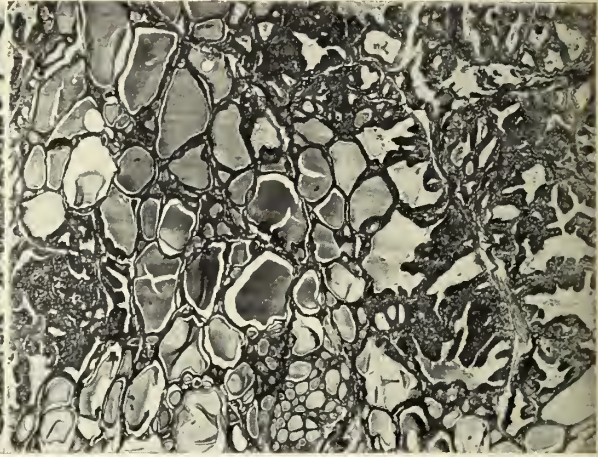


Fig. 2. Microphotograph from same gland as Figure 1 but at an area remote from the nodule. This discloses hypertrophy and hyperplasia of the parenchymatous portion of the gland, the characteristic finding of exophthalmic goiter.

tion of a toxic dose of thyroid extract or thyroxin.

One of these individuals is about thirty-three years of age, the other is fifty-three, approximately twenty years difference in their ages. This is considered one of the first differential features, the younger being the average age for patients with exophthalmic goiter and the older being that for patients with toxic adenoma. This factor has often led to confusion, for instead of being a hard and fast rule it is entirely possible for each disease to step over into the other's age group just as cancer and scarlet fever can occasionally be found outside their usual age distribution. Furthermore, it may be pointed out that toxic adenoma steps down into the younger age group much less often than exophthalmic goiter occurs in the older age. The reason for this is obvious, for by the time an individual has had the opportunity to develop a nodule and for that nodule to become toxic the patient has, in all probability, passed her fortieth birthday.

The physical examination reveals that one has a diffuse gland and the other a nodular gland. Necessarily the toxic adenoma must have a nodular gland but the exophthalmic goiter may also present nodules within its structure. This brings us to our first controversial point. H. S. Plummer has stated that he can differentiate between an exophthalmic goiter and a toxic adenoma without examining the neck. The occurrence of nodules in the glands of exophthalmic goiter patients is in the exact proportion that these nodules occur in the normal individual at a similar age. In exophthalmic goiter the parenchymatous portion of the gland, *i.e.*, that portion of the gland outside the nodule, shows hypertrophy and hyperplasia in a more or less marked degree. The presence of a nodule is only a coincidental feature and has nothing to do with the exophthalmic goiter except to aid in confusing the clinician.

Exophthalmos is observed in approximately 80 per cent of exophthalmic goiters. The remaining 20 per cent have no eye signs but present the same clinical symptoms and pathologic findings as those with exophthalmos. Exophthalmos is merely a sign which aids in

of large and prominent eyes has been confused with exophthalmos.

Among 121 cases of toxic adenoma which have been diagnosed clinically at the Minnesota General Hospital there were ten which showed definite exophthalmos. These have been thoroughly rechecked. Some of them appeared to be composed largely of adenomatous tissue with only a small strip of parenchymatous tissue at the periphery. When this parenchymatous tissue was examined microscopically it was found that it showed hypertrophy and hyperplasia in every instance. This finding was conspicuously absent in those cases of toxic adenoma which showed no exophthalmos. They uniformly showed normal thyroid acini in the parenchymatous portion, altered only by the compression of the adjacent nodules.

The presence of a bruit over the superior pole in a person with hyperthyroid symptoms always indicates an exophthalmic goiter in contradistinction to a toxic adenoma. The physiology of this is readily understood, for in exophthalmic goiter the blood supply is greatly increased out of all proportion to the size of the gland, whereas in toxic adenoma there is no increase in the blood supply to the nodule because each nodule has its own blood supply which is not influenced by the sympathetic nervous system and therefore not influenced by the excess secretion of thyroxin consequent to the hyperthyroidism.

A third sign and probably the most difficult to perceive is the presence of a peculiar high strung vivacious nervousness and mental activity in the individual with exophthalmic goiter and its absence in toxic adenoma. Plummer has expressed this feature by stating that these patients manifest numerous useful but purposeless movements as opposed to the useless and fidgety movements of chorea. If one were to observe these two types of cases side by side it would readily be perceived that the one would appear nervous, high strung, vivacious, fidgety and mentally alert, whereas the other, though giving the same subjective symptoms, would sit quietly and would not look nervous or

high strung, but, on the contrary, might even give the impression of being mentally a little dull. One may give the impression of being a neurotic because of her numerous complaints and high strung temperament, the other as being a neurotic because of the numerous complaints and apparent tranquillity.

favor of this statement it has been found that in those patients whose improvement was less than 75 per cent, 70.7 per cent had other ailments, whereas in those whose improvement was graded 75 per cent or more, only 38.2 per cent had other ailments. This suggests that some of the symptoms which had been attributed to the goi-



Fig. 3. Composite drawing demonstrating the histopathology in exophthalmic goiter in which a nodule was found. A. Tangential section showing the sites from which sections were made. B-1. Microscopic section through the adenoma showing compression and atrophic changes of the hyperplastic tissue. The colloid adenoma shows no evidence of hypertrophy and hyperplasia. C-2. Microscopic section of the gland showing hypertrophy and hyperplasia characteristic of exophthalmic goiter: acinar infoldings, columnar epithelial cells, decreased colloid content of the acini, lymphocytic foci and epithelial desquamation.

Thus it is seen that we have only three very definite signs by which to differentiate exophthalmic goiter from toxic adenoma clinically, *i.e.*, the bruit, the exophthalmos, and the peculiar high strung vivacious nervousness. Any two of these signs may be absent, but if all three are absent one should be very hesitant about making a diagnosis of exophthalmic goiter.

To complicate matters, the clinical signs as well as the histologic structure of the thyroid may be greatly altered by the administration of iodine.

H. S. Plummer has been able to correlate the clinical and pathological diagnoses in 97 per cent of his exophthalmic goiter patients. With the remaining 3 per cent he has been able to go back and pick up his error in either the clinical signs or in the pathological specimens.

Some authorities say that the two diseases are merely different phases of the same condition. To them belongs the responsibility of explaining the presence of hypertrophic and hyperplastic changes in the parenchymatous portion of the gland in exophthalmic goiter and its absence in toxic adenoma. The histologic structure has long been the accepted means of differentiating diseases. There is no reason for disregarding this axiom in thyroid diseases.

It might be argued that the two diseases are the same process because the end-results from operation in both toxic adenoma and exophthalmic goiter are approximately the same. This, of course, should not follow any more than would be the case if it were found that the end-results from gallbladder surgery approached the same proportions as that from thyroid surgery. Certainly these two diseases are not related. The point has been confusing, however, for Plummer, in an effort to point out the difference between the two diseases, has stated that a toxic adenoma does not recur following operation, whereas exophthalmic goiter may. The recurrence of the goiter and its associated hyperthyroid symptoms is an entirely different consideration than the end-results. The end-results may be dependent upon other associated conditions which may or may not have had some relation to the hyperthyroid state. In

ter may have had their origin elsewhere. In addition to this it was found that the duration of the disease before operation was an important factor in determining the eventual degree of improvement.

The response of the patient to iodine has also been mentioned as a means of differentiating between exophthalmic goiter and toxic adenoma on the assumption that toxic adenoma does not respond to iodine whereas exophthalmic goiter is definitely improved.

In reviewing the cases at the Minnesota General Hospital it was found that the pulse and basal metabolic rate in patients with exophthalmic goiter describe a uniform decline after the administration of iodine. An occasional case shows an increase in the pulse rate. These probably represent the iodine fast group in which small doses of iodine have been given intermittently over a long period of time. On the other hand, the cases of toxic adenoma describe no definite curve. Many of them show a decrease in the pulse and basal metabolic rate. Some show an increase and others show no change whatsoever from the administration of iodine preoperatively.

The histologic diagnosis of toxic adenoma, *per se*, remains an uncertainty. Only 58 per cent of the cases show evidence of hypertrophy and hyperplasia within the nodule. Perhaps a more diligent search would increase this percentage somewhat. The important consideration is the clinical history, laboratory findings and the absence of hypertrophy and hyperplasia in the parenchymatous portion of the gland. Just as the pathologist wishes to know the clinical history in many of his other diagnostic problems, so is it necessary to know the clinical history in these conditions. It is also desirable to emphasize that the parenchymatous tissue, *i.e.*, that tissue outside the nodule, may be altered by the adjacent nodule only to the extent that the nodule alters it by its compression or by its interference with the blood supply. These things must be taken into consideration when examining the section. A section should also be taken from a remote portion of the thyroid where the effects of compression will not be experienced.

An examination of two case histories and their pathologic specimens will help to illustrate the point. The case histories have been made composite so as to more clearly illustrate the typical features. The drawings are composite drawings for the same purpose but the microphotographs are from the actual cases.

The histologic structure showed a fetal adenoma with compression of the surrounding lobules and a few atrophic changes in the compressed acini. Examination of a more remote section revealed typical hypertrophy and hyperplasia of the acini, decreased colloid content of the acini, lymphocytic foci and a few des-

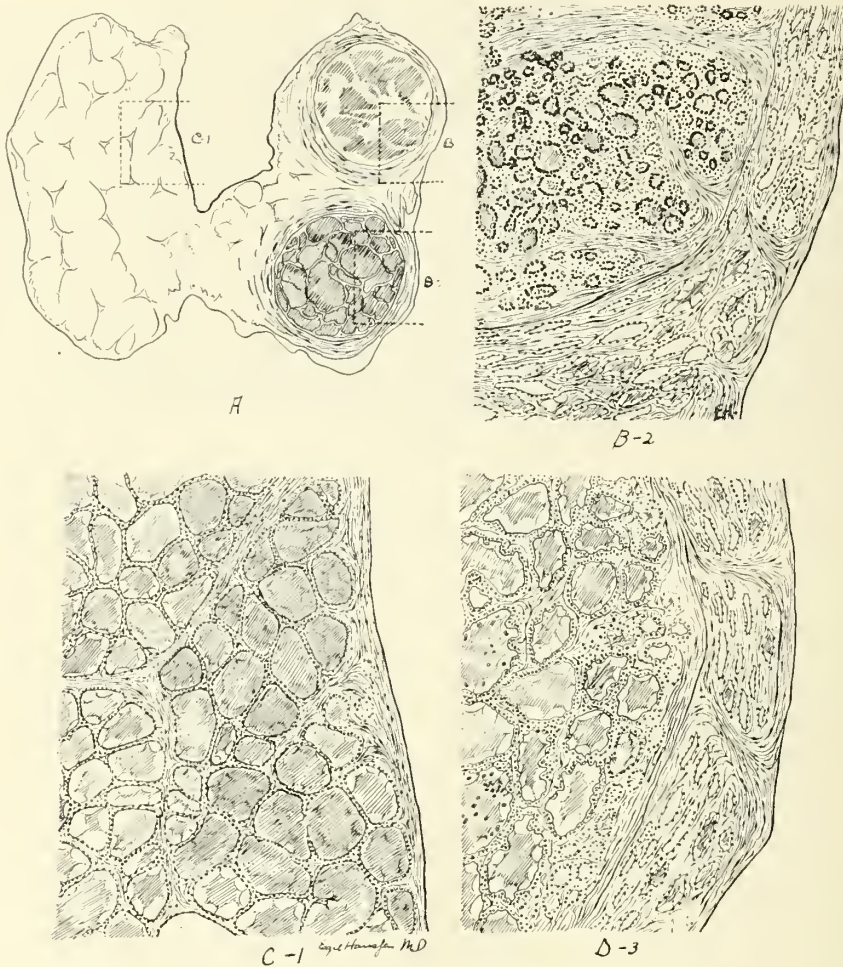


Fig. 4. Composite drawing depicting the histopathology in a toxic adenoma with the right lobe uninvolved. A. Tangential section indicating the sites from which sections were made. B.2. Microscopic section showing fetal adenoma with compressed and atrophic acini at the periphery. C-1. Microscopic section showing normal thyroid acini filled with colloid. D-3. Microscopic section showing colloid adenoma with hypertrophic and hyperplastic acini. (These hyperplastic changes can be found in 58 per cent of toxic adenoma.) Peripheral tissue shows compression and atrophic changes of the lobules and acini.

Case 1.—A woman, aged thirty, complained of nervousness, weakness, cardiac palpitation, weight loss, hyperhidrosis and a goiter. These are the cardinal symptoms of hyperthyroidism. Examination revealed a large nodule in the right lobe of the thyroid gland. She appeared very nervous, high strung and vivacious. There was no exophthalmos. Before iodine therapy had been instituted a bruit could be heard over the superior poles of the thyroid. The basal metabolic rate was plus 60, the pulse was 130. She improved markedly under iodine therapy.

Clinical diagnosis by the interne: Toxic adenoma. This diagnosis was made because she had a nodule in the thyroid gland and because there was no exophthalmos. No consideration was taken of the peculiar high strung vivacious nervousness and the bruit over the superior poles.

quamated epithelial cells: in fact, a typical picture of exophthalmic goiter. The clinical diagnosis was wrong because the clinician allowed himself to be confused by the absence of exophthalmos and the presence of a nodule. He should have recalled that nodules occur in the thyroid gland in a certain per cent of normal individuals. There is nothing which makes it impossible for one of these individuals to develop exophthalmic goiter.

Case 2.—A woman, aged fifty, complained of nervousness, weakness, cardiac palpitation, weight loss, dyspnea on exertion, hyperhidrosis and a goiter; again the cardinal symptoms of hyperthyroidism.

The physical examination revealed the patient sitting quietly. She did not appear to be nervous. There was no exophthalmos. There was a large nodule in the right lobe of the thyroid. There was no bruit over

the superior pole of the thyroid. The basal metabolic rate was plus 50, the pulse was 110. The response to iodine therapy preoperatively was inappreciable.

Clinical diagnosis: Toxic adenoma. This diagnosis was made because she had the clinical symptoms of hyperthyroidism and a nodule in the thyroid gland.

The histologic picture again showed a fetal adenoma with compression of the surrounding lobules and a few atrophic changes of the acini. A more remote section which was not influenced by the compressing nodule revealed normal appearing acini. On this basis and in conjunction with the clinical history the pathologist is able to confirm the diagnosis of toxic adenoma.

CONCLUSIONS

Clinical and pathological evidence has been presented to demonstrate that toxic adenoma and exophthalmic goiter are two distinct clinical and pathological entities. Both of these diseases offer diagnostic difficulties in their clinical and pathological aspects just as any other two diseases of the same organ may do.

Exophthalmic goiter may present at least three clinical signs which differentiate it from toxic adenoma, *i.e.*, exophthalmos, a bruit and the peculiar high strung vivacious nervousness and mental activity. These signs can be found in only those cases of hyperthyroid disease in which the histologic examination shows hypertrophy and hyperplasia in the parenchymatous portion of the gland. In other words, these changes do not occur in toxic adenoma. The presence of a palpable nodule in the thyroid gland in a patient showing these signs should not alter the opinion of the clinician to the extent of making a diagnosis of toxic adenoma.

The characteristic picture of exophthalmic goiter shows hypertrophy and hyperplasia, decrease in the colloid content of the acini, epithelial desquamation and lymphocytic foci in the parenchymatous portion of the gland altered only by the severity of the disease, by the administration of iodine and by the compression of any coincident nodules. The presence of a nodule in a gland presenting these findings should not convert the pathologist to the idea of making a diagnosis of toxic adenoma.

The histologic diagnosis of toxic adenoma can be made only with the aid of the clinical history and by finding the absence of hypertrophic and hyperplastic changes in the parenchymatous portion of the gland.

DISCUSSION

DR. MARTIN NORDLAND: I am very pleased to have the opportunity of listening to this excellent presentation. Hyperthyroidism in the advanced stage is usually easy to recognize. Difficulties are encountered in the border line cases and early diagnosis is difficult. There are some distinct differences between the hyperthyroidism of the toxic adenoma and that of exophthalmic goiter. Early diagnosis in both situations is difficult.

Adenoma with hyperthyroidism is unlike exophthalmic goiter. It is a pure hyperthyroidism such as one gets from the administration of desiccated thyroid. The symptoms of toxic adenoma are those of increased B.M.R. over a long period of time, prolonged strain from this increased B.M.R., and the additional load thus placed on the circulatory system. The onset is insidious. There is deterioration of health for a long period of time. The patient, however, feels in better health due to the increased basal metabolic rate. Lack of endurance later makes him feel fatigued. Palpita-

tion of the heart comes frequently. The course of the disease depends on the degree of the hyperthyroidism increase. It may be great or small. The long period of time before the symptoms develop and the long time it takes for the symptoms to develop, during which time the patient feels well, accounts for the number of years the disease may exist. This is conspicuous. All tissues are involved and the disease goes on to exhaustion.

Overwork is a common cause. Loss of weight comes late and then is rapid. This may average ten pounds per month. If the appetite fails they lose rapidly. Other troubles light up at this time. They have dyspnea and cardiovascular disturbances going on to heart failure. They may have arrhythmia while still quite well. Congestive heart failure depends upon other cardiac damage. Paroxysmal auricular fibrillation is the most common complication. If the heart disturbance is due to hyperthyroidism, then thyroidectomy is a cure.

The wave-like course of toxic exophthalmic goiter distinguishes it from toxic adenoma. The onset is sudden. There is a steady increase of symptoms in the toxicity of adenoma. Adenomatous goiter with hyperthyroidism never recurs after surgery but you may have recurrences of exophthalmic goiter.

The psychoneurotic is commonly confused with the patient who has exophthalmic goiter. Both conditions occur during the active period of life, around the thirty-fifth year. Fear in the psychoneurotic frequently causes symptoms similar to the cardinal symptoms of exophthalmic goiter. In the psychoneurotic the history is most valuable. Vivacity, loquaciousness, emotional instability, restlessness and semi-purposeless movements and nervous tension are common.

Goiter patients, as a class, are fearless, self-reliant, optimistic and fear surgery less than the majority of people. They are usually very good workers. The goiter patient usually has been well up to the short time before he presents himself. He is emotional but not scared.

DR. CARL O. RICE: I am surprised that more dissenting opinions have not been expressed for I am sure that all of you do not agree with what I have said.

In the cases of toxic adenoma in which there is only one nodule, that nodule can be enucleated and the patient will get well. However, it is unusual to find only one nodule, and therefore the surgical technic is essentially the same in both toxic adenoma and exophthalmic goiter.

It is possible that all three of the signs which I have mentioned as being present in exophthalmic goiter and absent in toxic adenoma can be absent from the former; but my observations have convinced me that such an occurrence is rather rare. Where none of these signs, *i.e.*, exophthalmos, a bruit, and the peculiar high strung vivacious nervousness, are present, I hesitate a long time before advising surgical removal in exophthalmic goiter. The therapeutic test as manifested by the administration of iodine is frequently of benefit in the doubtful cases. This aids in eliminating those cases of neurosis which simulate exophthalmic goiter.

The administration of iodine may also change the physical signs and symptoms, in a typical case of exophthalmic goiter, so that it often becomes difficult to confirm the diagnosis. It will also change the histologic picture of the thyroid in exophthalmic goiter. This should not lead to the error of making the statement that the disease is different.

F. A. OLSON, M.D., *Secretary*

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

Books Received For Review

MODERN DRUG ENCYCLOPEDIA AND THERAPEUTIC GUIDE. Jacob Gutman, M.D., Phar.D., F.A.C.P. Consulting Physician, Manhattan General Hospital, etc. 1393 pages. Price, cloth, \$7.50. New York: Paul B. Hoeber, 1934.

DISEASES OF THE SKIN. Oliver S. Ormsby, M. D., Clinical Professor and Chairman of the Department of Dermatology, Rush Medical College of the University of Chicago, etc. 1288 pages. Price, cloth, \$11.50. Philadelphia: Lea & Febiger, 1934.

I KNOW JUST THE THING FOR THAT! J. F. Montague, M.D., Medical Director, New York Intestinal Sanitarium, etc. 265 pages. Price, cloth, \$2.00. New York: John Day Co., Inc., 1934.

REVIEW OF INFECTIONS OF THE HAND. A Guide to the Surgical Treatment of Acute and Chronic Suppurative Processes in the Fingers, Hand and Forearm. Allen B. Kanavel, M.D., Sc.D. Sixth Edition, Thoroughly Revised. 552 pages. Illus. Price, \$6.00. Philadelphia: Lea and Febiger, 1933.

It seems rather futile to review the new edition of a book which has so long been a classic in its field and which has done so much to place surgery of the hand on a higher standard throughout the world. This new edition is a definite improvement over the older ones, the method of presentation is certainly better and the added material extremely important. It takes only a little study of it to reconcile one to the replacement of an old friend in the shape of an earlier edition with the newer volume and every surgeon should have this sixth edition handy for reference.

WALLACE H. COLE, M.D.

REPORT TO THE UNITED STATES GOVERNMENT ON TUBERCULOSIS WITH SOME THERAPEUTIC AND PROPHYLACTIC SUGGESTIONS. S. Adolphus Knopf, M.D. 59 pages. Illus. Price, \$1.15. New York: National Tuberculosis Association, 1933.

This work consists of three distinct parts: (1) Report from the International Union Against Tuberculosis at The Hague, 1932; (2) Report on War Veterans Hospital and the Care of War Veterans; (3) The Prevention of Tuberculosis in Children. In the preface there is one brief paragraph on allergy and immunity. The author speaks about the conference at the Hague; 750 members were present from thirty-three different nations. He speaks at some length about courtesies exchanged with the Queen Mother.

The first chapter is on gold therapy. The reports are both good and bad, so that apparently no conclusion can be reached. The author quotes a brief extemporaneous statement of 700 words made by himself. He believes that Leon Bernard, for example, figures that 50 per cent improvement with gold therapy is no better, if as good, as our figures from sanatorium type of therapy. He speaks about the toxicity of gold,—nothing new.

Chapter 2 discusses general after-care of tuberculosis. There were no papers given at the Conference on special physical and mental preparation of the patient save by the author. It had more to do with the economic status, the classifications, tuberculosis villages, etc. He speaks of the English Villages for the treatment of tuberculosis, which are partially self-supporting. He mentions some after-care work in Germany, tells how wonderfully the various Veterans' units take care of this in the United States.

Chapter 3 describes a few rehabilitation projects in the United States.

From Chapter 4 to Chapter 12 inclusive the author describes his method of diaphragmatic breathing and respiratory exercises in the prevention and treatment of tuberculosis. He believes that one can do the patient an astounding amount of good by somewhat lessening the respirations by diaphragmatic breathing, there are pictures, descriptions, affidavits. The author also suggests massage and cold water therapy to increase the tone of some of the patients. He suggests that the patients be taught to hold their breath for certain length of time, thus producing an artificial hyperemia of the lungs. He discusses the Knopf Indoor Tent—"Less chance for a relapse if the tuberculous individual breathes pure fresh air." He mentions BCG in passing in Chapter 10 for its preventive value in children. He says it is not being used in England and quotes Park's 413 cases with good results. He also adds toward the end of the chapter the value of breathing in the prevention of tuberculosis. Chapter 12 is devoted to exercises for expelling residual air.

In Chapter 13, the author briefly mentions the value of the salt-free diet in the treatment of tuberculosis of the skin and tuberculides of the skin, with glowing reports of its value.

My personal opinion is that the reports from The Hague are far too brief and that the author could have covered his adjunct to therapy in far less space and that the book is hardly scientific but written more for the lay public. It may be of distinct value to certain groups and of benefits to certain patients.

G. R. DUNCAN, M.D.

THE MANAGEMENT OF FRACTURES, DISLOCATIONS AND SPRAINS. John Albert Key, B.S., M.D., and H. Earle Conwell, M.D., F.A.C.S. 1164 pages. Illus. Price, \$15.00. St. Louis: C. V. Mosby Co., 1934.

This new text-book by Drs. Key and Conwell is exactly what the authors claim it to be. That is, a book written for the student, the general practitioner, and the surgeon. The book certainly furnishes a practical working guide for the treatment of fractures, dislocations and sprains. It is complete and is well illustrated. The chapter on the Medico-Legal Aspects of fracture cases is particularly valuable. It is regrettable that the chapter on Estimation of Permanent Disability in fracture cases is so brief and also that so little of Boehler's work has been included in this modern book. This volume is the best on fractures that has ever been published in this country and will remain the standard for many years.

M. O. HENRY, M.D.

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ROENTGENOLOGY IN DIAGNOSIS*

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Rochester, Minnesota

PERCY GHENT, in a brief biography of Roentgen, credits Abbé Jean Antoine Nollet, French physicist of peasant birth, with exhibiting a curious, ovoid contrivance of glass, which he called "the electric egg." It had been rarefied, more or less, by means of an air-pump and, energized by a static machine, a spark was made to leap across this egg-like device with a crackling sound. This discovery was made about the middle of the eighteenth century and almost a century elapsed without further recorded progress of great significance in this field of scientific research. Faraday, in 1837 and later, carried out researches in which he discovered the phenomenon of electromagnetic induction that made possible the production of electrical power as it is now known. His work marked the beginning of the long series of investigations that ultimately brought about the discovery of the x-ray. To Roentgen belongs the supreme honor of having first recognized the existence of this new, unseen, and mysterious radiation; the discovery had been made possible by the patient study and endless experiments of Faraday and the labors of Von Geuricke, Nollet, Plucker, Geissler, Gassiot, Hittorf, Morgan, Crookes, Thomson, Hertz, Lenard, and many other untiring trail-blazers of science. Ghent wrote: "A solitary worker in his simple laboratory in Wurzburg, on that historic Friday, the eighth day of November, 1895, his Crookes tube hidden beneath a light-proof shield of black cardboard and excited by a Ruhmkorff coil, he had observed, in the darkened room, the weird glow of that momentous scrap of paper coated with barium platino-cyanide, and made

those investigations which gave to mankind, in that dramatic moment, a new degree of vision. And with a restraint almost superhuman, he devoted nearly two months to the intensive investigation of his great revelation before announcing it to the world." December 28, 1895, Roentgen read a paper before the Physicomedical Society at Wurzburg. It was modestly entitled "Concerning a new ray." That this discovery caught and fired the imagination of industry is evidenced by the statement of Herman Lemp, works engineer of the General Electric Company, that he was engaged from May, 1896, to March, 1897, in developing a suitable exciting service for x-rays, and that in the spring of 1897 his company had practically completed these various commercial sets. In 1900, a convocation of professional men interested in x-rays assembled in New York City and formed the American X-Ray Society, the forerunner of the present American Roentgen-Ray Society. In 1896, Becker made roentgenograms of the stomach and of a loop of intestine in a guinea pig, and in the following year Cannon studied the alimentary canal of cats by the aid of the fluoroscopic screen. In 1899, Williams and Cannon studied the alimentary tract of man by the fluoroscopic screen, and made roentgenograms of it in 1901. Much of the earlier American literature is concerned with the use of the x-ray as a therapeutic agent in malignant disease, but even before the opening of the present century, a few excellent articles were to be found, particularly in the German literature, on the subject of the x-ray in its relation to diagnosis of disease.

The greater development of the x-ray as an instrument in diagnosis has occurred in the pres-

*From the Section on Roentgenology, The Mayo Clinic, Rochester, Minnesota. Read before the meeting of the Southern Minnesota Medical Society, New Ulm, Minnesota, September 25, 1933.

ent century. This development has come as a result of improvements in machinery, the substitution of the film for the glass plate, improvements in the quality of the film emulsion to lessen the necessary time of exposure, the addition of the intensifying screen, the Potter-Bucky diaphragm, and the perfection of factors in technic, for much of which we are obligated to physicists, engineers, and research institutions of universities and of great manufacturing plants.

The roentgenogram is a reproduction of shadows created by the resistance of the structures of the body to the passage of the x-ray. The more resistant the structure to the ray, the less dense the shadow on the film, and, conversely, the less resistant the structure to the ray, the more dense the shadow cast on the film. The more compact bone of the cortex contrasts with the less compact bone of the medullary portions; the surrounding periosseous tissues cast shadows only by virtue of their bulk. This phenomenon offers two factors on which to base the interpretation of lesions in bone—changes in contour and alterations in density. These may occur singly or in combination; they may involve the bone and also the surrounding periosseous tissues. A prime requisite in interpretation is, of course, a knowledge of the normal and its range of variations. A mental picture of the gross changes, with an understanding of the histologic structure and the various changes in this in the varying stages of development in the individual types of lesion involving bone, aids materially in correlating the roentgenographic findings and establishing the diagnosis. In the interpretation of lesions of the thorax one is similarly concerned with contours and densities, contours of the pleura and diaphragm, the constituent structures of the mediastinum, and the alterations and distribution of densities in the hilum and the lung fields. In the study of the gastro-intestinal tract the introduction of a contrast medium is necessary to outline structures ordinarily non-resistant to the passage of the x-ray. Here the interpretation is made largely on alterations in normal contour of the structures, as outlined by the contrast medium.

Roentgenology has made possible the study of living pathology. To the pioneers in the observation of the characteristic changes in contour and alterations in density, seen separately or in combination, exhibited by given types of lesion, and

their painstaking segregation of the plates and films depicting these, must go much of the credit for the rapid development of the science of roentgenology. The reproduction of these in publications has done much to widen the scope of the science and stimulate the interest of members of all branches of the profession, until roentgenology has become all but indispensable to them. With improvement in machinery, material and technic has come a quality of roentgenograms that has enabled study of the finest detail, with the result that the roentgenologist has become associated with the anatomist, the biochemist, the physiologist, and other workers in experimental fields. This has materially widened the scope of roentgenology in the study of disease and its demonstrable effects on the body. Contrast materials have been developed, which in the process of excretion have made visible the gallbladder, the genito-urinary tract, the liver and the spleen. Other materials have been injected into the maxillary sinuses and into the spinal canal. By removal of the cerebro-spinal fluid and its replacement by air or gases the various structures of the brain have been visualized in their relation to one another, and by injections of air the conformations of the cranial cavity have been brought into relief. As a result of all these advances much has been added to the knowledge of the normal anatomy and physiology as well as the pathologic processes involving these various structures. Roentgenology, in experienced hands, is now recognized as the most rapid and the most accurate of all diagnostic methods in the fields in which it is applicable. Case aptly remarked: "It is too much to expect that any man can be a specialist in all the branches of medicine in which roentgenology plays a useful part." With this in mind the limitations of the individual method must be remembered. All too common are cases in which amputation or other surgical intervention has been advised largely or wholly on roentgenologic findings, in which careful correlation of the clinical and roentgenologic data, in some instances with biopsy, has reversed the decision and saved unnecessary mutilation of a patient. The diagnosis of a malignant lesion brings a severe mental shock to the patient, his relatives and friends. On the other hand, the misinterpretation of a malignant lesion as benign may rob a patient of the opportunity of appro-

priate treatment at the time when it offers the greatest promise of cure. Errors either way are not soon forgotten or forgiven. The ideal arrangement, therefore, is a consideration of all available clinical and laboratory data in the establishment of the final diagnosis.

From the standpoint of the patient it is almost enough that the roentgenologist shall properly decide whether there is a lesion. But increasing knowledge has made it possible to go farther than that. One can state that a given lesion is benign or malignant, that it is of a certain type of benignancy or malignancy, and thus materially assist in determining what therapeutic measures, if any, should be carried out in the individual case. The results of any method of treatment may be checked and recorded periodically, that all concerned may know of its efficiency or futility. If the lesion is of a malignant type, roentgenographic or roentgenoscopic examination may be made for evidences of secondary deposits (metastasis) in the lungs or other parts of the skeletal structure. The presence of metastasis may materially alter the prognosis and the method of treatment; in some cases it may save useless surgical intervention. This knowledge has come from the comparison of the roentgenogram with the gross pathologic specimen removed at operation or at necropsy, which has proved it to be a reproduction of the changes observed macroscopically and microscopically in various types of tissues. With certain reservations, it is possible to state that some of the features of these changes are pathognomonic. In this necessarily limited consideration of a broad subject it is my purpose to stress these in an attempt to establish foundations on which to build opinions.

Lesions involving bone and those involving the gastro-intestinal tract produce largely contour shadows in the roentgenogram. In both of these groups the contour is maintained throughout in the benign lesion; it may be irregular, it may be expanded or distorted, but it remains continuous. In malignant lesions there is a definite break in the contour, a sharp demarcation between the normal and the abnormal. When the contour is not visualized in the roentgenogram as such, the margins of the filling defect are smooth in the benign lesion and indefinite, serrated, or not discernible in the malignant lesion. In benign lesions of bone, where a tumor expands the cortex or encroaches on the sur-

rounding periosteal tissues, the shadow of the tumor is definitely encapsulated, whereas in malignant lesions the invasion of the soft tissues is promiscuous, or at least indefinite; there is usually denuding of the cortex corresponding to the area of the tumefaction. Exceptions to this general rule will be mentioned in consideration of individual lesions.

As a rule benign lesions in the thorax involve the parenchymal portions of the lung fields; there is usually a zone of decreased density between the shadow of the hilum and that of the lesion, whereas in the greater number of malignant lesions they are continuous with and radiate from the shadow of the hilum. If there is effusion in the benign types, the heart and mediastinal structures will tend to be displaced from the affected side, to a degree varying with the amount of the effusion; in the malignant type there will be little if any displacement of the heart and mediastinal structures. A clinical note of import is that aspiration of benign effusions will yield a clear or straw-colored fluid, whereas those of malignant origin will yield bloody or blood stained fluid. Occasionally malignant cells can be isolated in the fluid or obtained from the point of the puncture needle.

A study of the site of the densities in lesions of the lung offers certain criteria which are helpful in the differential diagnosis. By arbitrarily dividing the lung fields these fields may be mentally divided into an inner and an outer segment, and then by horizontal lines into upper, middle and lower segments. With this mental picture various lesions can be assigned to selective situations with a fair degree of accuracy. The intensity of the shadow also offers some information. In the inflammatory lesions there is a tendency to deepening of the intensity of the shadow, whereas in the malignant lesions a translucent or hyalin appearance of the shadow predominates.

In the inner upper segment some accentuation of the linear markings is frequently observed. This does not transcend the median line; it is commonly a sequel of an acute respiratory infection and is seldom of any clinical significance. Tuberculosis, usually first apparent in the second interspace in the upper outer segment, may involve the first interspace and the apex. Certain roentgenologists will not make a diagnosis of tuberculosis without some evidence of the lesion

in this situation. Bacilli of tuberculosis may be found in the sputum of patients in whom shadows were noted only in the hilum or in the basal area. These are probably cases in which direct infection of the bronchus from breaking down of tuberculous nodes has occurred, but there is no roentgenologic evidence which can be considered reliable for the interpretation of tuberculosis. Extension of the lesion frequently distributes shadows over other than the areas mentioned, but in these the upper outer segment also is involved, and serves to corroborate the diagnosis. Tuberculosis with bronchiectasis is occasionally seen, and here again evidence of the lesion in the upper outer segment serves to designate tuberculosis as the primary infective factor. Two lesions having their base in the middle inner segment and radiating toward the upper or lower segment, are abscess and primary carcinoma of the bronchus. The abscess following extraction of teeth or tonsillectomy frequently radiates toward the middle or the lower segment. Occasionally the interval of decreased density of the hilum will not be sufficient to distinguish the abscess. Bronchoscopic examination, and securing tissue for microscopic examination if possible, may be necessary to define the diagnosis. Limited involvement of the bronchus by carcinoma may result in obstruction with marked emphysema, if the stoppage should be of the ball-valve variety, or atelectasis. Involvement of the pleura is not uncommon in carcinoma; secondary abscess or bronchiectasis may complicate the roentgenogram.

Bronchiectasis involves predominantly the lower inner segments, and the density of the shadow will vary as to whether the cavities are filled or empty at the time the examination is made. If the patient is placed for a time with the head down toward the feet an attack of coughing will often be excited which will empty the cavities and make them more apparent. It is an interesting clinical fact that hemorrhage is often a feature of tuberculosis, abscess, carcinoma of the bronchus and bronchiectasis; roentgenographic examination may be useful at times in eliciting the etiologic factor in pulmonary hemorrhage.

Among the lesions involving several segments and frequently bilateral are pneumoconiosis (anthracotic type), miliary tuberculosis, pneumoconiosis (silicotic type), the so-called non-

tuberculous infections, which include spores, fungi, and organic matter observed in excessive amounts in certain occupations. It may be difficult to distinguish anthracosis from miliary tuberculosis; both exhibit a fine miliary infiltration of soft density, diffusely distributed over both lung more intense toward the bases, whereas the latter may appear more intense as it approaches the fields. The former may show a tendency to be apexes. Silicosis occurs most commonly in the middle segments, involving to a lesser degree the upper and sometimes the lower segments. The lesions have a tendency to become conglomerate, presenting irregular splashes of increased density. Nontuberculous infections present a variety of areas of much increased density depending on the specific etiologic factor. Bizarre patterns are not uncommon in this group. Primary carcinoma in the lung infrequently appears as a bilateral, diffuse infiltration of the lung fields in which heavy, coarse fibrosis is the roentgenologic feature. Metastatic involvement of the lung occasionally is seen as diffuse fibrotic infiltration. More commonly it occurs as multiple circumscribed nodules varying in size from a few millimeters to several centimeters, and, in certain cases, from myriads of minute shadows to a few nodules scattered through the lung fields. These nodules have a characteristic translucent density which with their definite circumscription can well be called pathognomonic of this lesion. Pulmonary fibrosis, general accentuation of the markings of the lung, is common among patients of advanced age, particularly those with a history of asthmatic bronchitis and emphysema of long standing, it is often observed among patients with cardiac lesions in which chronic passive congestion has been a sequel.

Lobar pneumonia is characterized by a homogeneous flat density, frequently well outlined on one margin by the interlobar pleural line. Bronchopneumonia is most commonly observed in the lower segments; it exhibits a coarse mottled shadow somewhat similar to that seen in bronchiectasis. In the lower segments it transcends the median line and involves the outer and the inner segments.

Pleural effusion is characterized by a homogeneous density, varying from a peripheral shadow demarcated by the outline of the visceral pleura bordering the lung which is compressed, to complete obliteration of the structure of the lung

by a dense, flat shadow. The same applies to empyema, which is invasion of the pleural cavity by a pyogenic infection. A roentgenogram made with the patient in a horizontal position is often useful in checking the presence or absence of fluid in the pleural cavity. Pneumothorax is characterized by an area of decreased density, in which no evidence of the structure of the lung remains. Careful inspection may be necessary to elicit the borders of the collapsed lung. Mediastinal tumors enlarge and otherwise distort the normal contour and relations of the heart and aorta. Fluoroscopic observation may be necessary to distinguish tumor from aneurysm. Aneurysm will be continuous with and inseparable from the shadow of the aorta. Pulsation will be observed in the majority of aneurysms; a well-organized clot in an aneurysm may largely inhibit this. Transmitted pulsation in some tumors may also be confusing. Substernal or intrathoracic thyroid glands will move up and down if the patient is asked to perform the act of swallowing while under observation. In the roentgenogram the margins of the aneurysm are usually smooth and regular, and careful study may elicit evidences of calcification in the wall. Margins of lymphomas or other mediastinal tumors are more often irregular, straightened or multilobulated. Occasionally tuberculosis of the cervical or dorsal portion of the spinal column with formation of a perivertebral abscess may simulate mediastinal tumor. Lateral and lateral oblique views made while using the Potter-Bucky diaphragm will rule out such lesions; they will also assist materially in accurate location of all other types of tumor.

In benign inflammatory lesions in which the bone is involved, periostitis should first be considered. Periostitis reveals a thin line separated from the underlying cortex of the bone by a thin shadow of decreased density, most commonly observed in the tibia and fibula in association with chronic ulcers of the leg. It is characterized roentgenographically by a smooth margined, wavy irregularity of contour. Syphilitic periostitis has a tendency to assume what has been designated a lace-work pattern, an intensely proliferative process. Osteitis involving the long bones is more commonly seen in the bones of the lower extremities, usually in the tibia. It may involve the anterior aspect of the bone and appear as a widely distributed thickening of the

cortex, or it may be more localized, involve the entire circumference of the cortex, expanding it in an elliptical manner. The medullary cavity of the bone is always distinguishable in all forms of osteitis. When localized osteitis involves the femur, it cannot be distinguished roentgenographically from chronic nonsuppurating osteomyelitis of Garre. Osteitis involving the os calcis is usually part of a chronic low-grade type of infection. Syphilitic osteitis presents the predominant feature of sclerosis, often with irregularity or a fuzzy appearance of the cortical contour. Occasionally, probably due to gummatous involvement, the cortex will appear moth-eaten, with multiple small areas of lesser density distributed through the sclerotic areas. Marked widening of the diameter of the bone, with accentuation of the trabecular elements of the bone, may be present, giving it a striated appearance, similar to that seen in cases of osteitis deformans. Osteitis involving the pelvic bones will be considered later.

Osteomyelitis is shown roentgenographically as a greatly increased density of the bone, which includes the cortex and the medulla. In the first two weeks, on the average, the results of the reaction of the bone tissue to the infective agent will not have produced changes in the bone which are demonstrable in the roentgenogram. Later, small areas of decreased density will indicate suppuration and the formation of abscess. There is usually a concurrent periosteal proliferation, which in chronic cases may result in considerable expansion and irregularity of the contour of the bone. The laying down of new bone parallel to the shaft forms a thick layer on the outer margins of the bone, the involucrum. Sequestra are seen as portions of bone tissue lying free in an area of lesser density depicting necrosis and bone abscess. In tuberculous osteomyelitis, the evidences of reaction are absent in the surrounding tissues; marked destruction with little, if any, evidence of surrounding proliferation of bone is strongly suggestive of tuberculosis as the primary infective factor. A sclerotic type of increased density is characteristic of syphilitic osteomyelitis. As in syphilitic osteitis, multiple areas of decreased density scattered through the sclerotic shadow are seen in syphilitic osteomyelitis. I have seen a gumma in the upper end of the tibia that had the appearance of a giant cell tumor or fibrocystic disease.

Osteitis involving the bones of the pelvis is characterized by a loose mesh-work appearance of the bone, marked accentuation of the trabecular elements of the bone, actual enlargement of the bone, and occasionally formation of cyst. Part of the pathologic process is the subperiosteal deposition of bone tissue, so there is actual enlargement of the diameters of the contour of the bone, best seen in the head, the femurs, the tibias and the ischium. I have seen cases in which osteitis involved the whole or part of one os innominatum. In some cases, the age of the patient, the character of the lesion and the absence of clinical data to explain it leads to the interpretation of early osteitis deformans. In other cases, a sclerotic type of density among women with a history of one or more miscarriages leads to the conclusion that syphilis was probably the etiologic factor. Localized areas in another case were evidently metastatic infectious processes secondary to a pyogenic infection elsewhere. In another case, dense sclerosis of all bones was a part of a generalized osteitis sclerotica (marble bone). Trauma, particularly of an oft repeated occupational type, may have been a factor in some cases; in others there was no clinical explanation.

Osteitis deformans (Paget's disease) may involve the entire skeleton with the head, shafts of the femurs, tibias and pelvic bones exhibiting the characteristic changes. The distinction between osteoplastic metastasis secondary to carcinoma of the prostate gland and osteitis deformans sometimes presents difficulties. The roentgenographic picture of carcinomatous metastasis of the osteoplastic type gives a coarsely granular type of density, in which the trabecular elements of the bone are obliterated; if any background is apparent it is of destruction of bone. There is no enlargement of the bone shadow. In case of doubt, roentgenograms should be made showing the heads of the femurs, the ischium and upper third of the shafts of the femur; the differential points enumerated are well exhibited in these parts. Roentgenograms of the head of the femur, of the tibia and of the shafts of the femurs should be made, to corroborate the diagnosis of osteitis deformans.

Osteitis fibrosa cystica, fibrocystic disease, and von Recklinghausen's disease, all showing varying degrees of lessened density in the bones, have been considered by observers as having

their origin in disorders of the parathyroid and other ductless glands. Experimental work has proved that the parathyroid glands have a direct relation to calcium metabolism, and clinically the presence of parathyroid tumors has resulted in extreme degrees of osteoporosis in bone, the calcium lost from the bone being deposited in other tissues of the body. Removal of the tumors or appropriate treatment of the parathyroid disorders has resulted in restoration of calcium to bone and a diminution of the calcium content of the other tissues. The tendency to formation of cyst common to this group is also seen in osteitis deformans, and it has been suggested that this disease is probably traceable to some defect in the parathyroid and the suprarenal glands. Pathologists long ago accepted the association of this group of lesions, and clinical and experimental observations now being made will probably bear out their contention.

Metastatic malignant lesions in bone are seen in two forms, the osteoclastic, or destructive, and the osteoplastic, or proliferative. The term "melted ice" very aptly describes the osteoclastic form. If one can visualize the skeleton as being formed of ice, the lesions resemble more than anything else the results of a stream of heat against the structure. In the long bones, there is abrupt dissolution of the cortical contour, and a section seems to have been literally melted out of the bone. Similar lesions are occasionally seen involving the vertebræ. In the pelvic bones, filling defects of varying size show serrated or entirely obliterated margins. Extensive involvement of almost the entire skeleton is not uncommon in lesions secondary to carcinoma of the breast. The osteoplastic form is characterized by a generalized increased density of the bone shadow. In the majority of cases, proliferation keeps pace with destruction; in others, areas of destruction of bone are apparent with splashes of increased density scattered throughout the bone. The lesion often first involves the inner margin of the ilium along the sacro-iliac synchondrosis and may involve the whole of one pelvic bone before spreading to other parts of the skeleton. In the advanced cases it may involve almost the entire skeleton. The characteristics of density of bone have already been described in the consideration of the distinction between carcinomatous osteitis and osteitis deformans.

Benign osteogenic tumors of bone occur among

patients in the earlier decades of life. Their characteristic of retaining an intact contour has already been mentioned. Distinction of the various types depends on the preponderant tissue of the tumor; chondromas are composed largely of cartilage, which offers little if any resistance to the roentgen ray; fibrous tissue offers slight resistance, and bone tissue offers the maximal amount. Exostosis and osteochondromas cast varying shadows of a cauliflower type, depending on the content of cartilage and bone in the tumor. Exostosis may have a broad base or be attached to the bone by a narrow pedicle. Osteomas cast shadows of extreme density owing to the preponderance of bone cells in them. Giant cell tumors occur characteristically in the epiphyses of long bones of persons aged from sixteen to thirty-five years. As a rule they appear as a solitary tumor. They are most often found in the lower end of the femur and the upper end of the tibia and fibula, less frequently in the lower end of the radius and ulna, humerus, os calcis, ilium, clavicle and the phalanges. They may also involve the jaw and the spine. The tumors contain immature cells and belong to the connective tissue group. The typical roentgenographic picture of giant cell tumor is that of expansion of the cortex, with multiple trabeculae over a field completely lacking in density. The shell of bone may be gradually thinned, the trabeculae may be lost, pathologic fracture may occur in the thin shell, there may be a break in the continuity of the contour as a result of the disappearance of the shell over the greater area of the tumor. They may be distinguished from malignant tumors by a thin wave of bone tissue extending over the tumor, and careful study will elicit a shadow of the smooth margined soft tissue in the periosteal soft tissues. These tumors recur frequently after curettement; malignant changes in them have been reported. At present radiotherapy seems to be the most effective treatment.

Cysts of bone are usually single; they may result from hemorrhage into the bone with absorption of the contents, the result of trauma, or as a sequel to isolated infected emboli. They appear as smooth-margined filling defects in the substance of the bone. Thorough curettement, with removal of the lining membrane, swabbing with some escharotic solution, and filling with

bone chips is usually successful in their obliteration.

Osteogenic sarcoma presents the characteristics of malignant tumor in bone. It exhibits most vividly the sharp demarcation of the normal from the abnormal, the elevation of the periosteum at the margin of the tumor and denuding of the cortex over the area of tumefaction. It is most common in early adult life; predominant in the second decade. The metaphysis is the seat of predilection; it rarely, if ever, begins in the epiphysis. Most of the tumors occur in the bones around the knee joint; a small percentage occur in the humerus and the bones of the shoulder girdle, and in the bones of the pelvis. The old types can still be distinguished roentgenographically: the periosteal type, with its sun-ray radiation of bony spicules at right angles to the shaft, into the periosteal tissues; the medullary type, with its area of destruction in the bone and promiscuous invasion of the periosteal soft tissues; and the sclerotic type, which is shown as a dense area expanding the contour of the bone, and is sometimes difficult to distinguish from syphilitic osteitis. The prognosis in osteogenic sarcoma is grave; amputation offers the only hope of cure; examination for metastatic involvement should always be made before this is undertaken. Irradiation has had little success in the treatment of sarcoma; it is occasionally used as a therapeutic test in distinguishing between sarcoma and hemangio-endothelioma.

Hemangio-endothelioma (Ewing's tumor) commonly affects persons in the first and second decades of life, it is rarely seen in the third and fourth decades. Its site of predilection is the long bones, usually in the shaft and rarely in the ends. The tibia, fibula, humerus, ulna, femur, small bones of the extremities and the skull are most frequently involved, and it is not uncommon in the clavicle, ribs and vertebrae. It is believed to have its origin in the perivascular or lymphatic endothelium. The medullary cavity is frequently extensively involved and the tumor appears to begin simultaneously in numerous areas in the bone marrow, filling the medullary cavity as well as the larger haversian canals. These diffusely disseminated multiple foci enlarge rapidly, become confluent and expand in all directions. The tumor may liquefy and resemble osteomyelitis grossly. A concurrent periosteal defense reaction is stimulated and successive lay-

ers of newly formed bone may be laid down parallel to the shaft, resulting in an elliptical tumor with an onion-like series of layers considered pathognomonic of this disease. Metastasis occurs early and practically always in bone, particularly in the skull. Visceral metastasis may occur, but it is not common. Hemangio-endothelioma is particularly amenable to the action of roentgen rays or radium; this is significant in differential diagnosis.

Angiosarcoma may be classified roentgenographically and therapeutically as hemangio-endothelioma. It is characterized by extensive proliferation of the bony tissue, and marked hypertrophy of the periosteal soft tissues.

Myeloma is a disease affecting patients in the fourth to seventh decade of life; it usually occurs in the fifth decade. The short bones are often affected, particularly the ribs, sternum, vertebrae and skull. In the long bones it affects the mid-portion rather than the end. Osseous involvement may be diffuse. Myelomas are usually multiple, ranging in size from 1 mm. to 4 cm. The tumors are thought to have their origin in the hemopoietic cells of the bone marrow, being composed of plasma cells or their derivatives. Bence-Jones, in 1847, reported the presence of a peculiar protein in the urine in cases of osteomalacia; this has been found since in a large percentage of cases of myeloma and is regarded as of diagnostic import. Roentgenographically, myeloma violates all rules for the diagnosis of malignant tumors of bone. In the skull, the ribs and the vertebrae and bones of the pelvis it is characterized by multiple, small, smooth-margined areas that have the appearance of having been made by a metal punch. Similar areas are seen in the long bones. In other cases the ribs and the long bones reveal expansion of the cortex and multiple trabeculations not unlike those seen in giant cell tumor. In the latter group, biopsy has proved them to be myeloma. The prognosis in myeloma is hopeless; the lesion may recede rapidly under irradiation, but permanent recovery by this method has not been recorded. The average duration of the disease is one to two years. In diffuse involvement of the skeletal structure, myeloma may be difficult to distinguish from the osteoclastic form of metastatic carcinoma, but, as the end-result is the same in both forms, this is not a serious error.

In the diagnosis of lesions involving the

stomach and small intestine, roentgenoscopy has proved to be the most rapid and most accurate method. Examination with the aid of the fluoroscopic screen allows the patient to be turned to any desired angle, in the vertical or the horizontal plane, and palpatory manipulation synchronous with ingestion of the contrast medium allows approximation of the walls and detection of lesions that might easily be masked in roentgenographic examination alone. Such examination eliminates mistaking for lesions, pseudofilling defects and pseudoniches and incisuras, by demonstrating persistence of the evidence at all angles and in all planes in repeated visualizations under palpatory manipulation. Roentgenograms are made to verify the roentgenoscopic findings, and to provide tangible evidence of the lesion in a permanent record. Comparison of roentgenographic with roentgenoscopic findings over a number of years in large series of cases has proved conclusively the fallibility of the roentgenographic method alone. Interpretation is based on changes in the contour of the outlined viscus, technically expressed in the terms "filling defect," "niche," "incisura" and "deformity." These are the direct signs. Additional information is supplied by alterations in the functions, seen as hyperperistalsis, hypoperistalsis, hyper-tonicity, hypotonicity, rapid or delayed emptying time, and other indirect signs.

Diverticulum of the esophagus is characterized by a smooth-margined dilatation of varying size, which has the pathognomonic feature of emptying from the top. With the patient turned to the required angle, the contrast substance will be seen to spill over and to run parallel to the expanded shadow, around and below the diverticulum. Cardiospasm usually involves the esophagus at or near the cardiac orifice of the stomach, and causes a smooth-margined dilatation which empties through a narrow constriction at its lower extremity. Stricture presents smooth-margined narrowing and tortuosity of the esophagus, emptying at its lower extremity. Carcinoma exhibits the characteristic sharp demarcation between the normal and the abnormal, with keen-edged irregularity of the contour below this, terminating in marked constriction. Careful observation of the contrast substance as it passes from the esophagus to the stomach, discloses the opaque material passing along the lesser curvature to the angle and the pylorus in

a comparatively straight line. Deviation of the stream of the opaque substance should arouse suspicion of carcinoma of the cardiac end of the stomach, and examination of the patient in the prone and in the supine positions on the horizontal table will corroborate this finding when the lesion is present. Emptying of the esophagus above the normal level, or deviation of the lower part of the esophagus, suggests the possibility of the congenital form of diaphragmatic hernia. Examination of the patient on the horizontal table, in an inverted position, will assist in visualizing such a lesion if present.

The pathognomonic sign of benign ulcer in the gastric wall is a smooth-margined projection from the contour, usually along the lesser curvature, continuous with the contour throughout. This is called the niche and is a reproduction of the barium-filled crater of the ulcer. Rarely a shadow is seen beyond the contour, usually with an hour-glass contraction of the stomach on the greater curvature opposite. This is a perforated ulcer with an accessory pocket in some of the surrounding tissues or structures. Accompanying ulcers of the lesser curvature, often there is associated prepyloric narrowing, the rugæ of the stomach have a tendency to converge on the site of the ulcer and an incisura of varying depth is apparent in the greater curvature opposite the lesion; in some cases it is so deep as to cause hour-glass deformity of the stomach.

Carcinomatous ulcer may be indistinguishable from benign ulcer, but usually the crater of a carcinomatous ulcer is wider in diameter, has less tendency to project from the contour, and on palpation, in many cases, a large, flat crater will be revealed, with a surrounding zone of lightened density sharply demarcated at its margins, the "meniscus" ulcer of Carman.

Carcinoma of the stomach appears generally as a definite break in the contour, below which is a filling defect of varying dimensions. There is a polypoid type, in which filling defects are apparent, due to the displacement of the contrast substance by large masses of tumor, and there is an infiltrative type in which the walls of the stomach are stiffened and straightened out until in some cases the stomach is converted into a narrow tube through which the opaque substance passes quickly into the duodenum and small intestine.

The infiltrative type may be difficult to distinguish from syphilis of the stomach, which

also is a diffusely infiltrative process. Syphilis fails to give the definite demarcation; the filling defect is smooth-margined in contradistinction to the keen-edged appearance of carcinoma, and the termination of the lesion in carcinoma tends to be a sharp point, whereas in syphilis it tends to be more globular. A clinical note of value is that in syphilis the general well-being of the patient is inconsistent with the extent of the involvement of the stomach. In doubtful cases the therapeutic test may be necessary to decide the diagnosis.

In benign tumors of the stomach the continuity of the contour of the stomach will be retained at all angles and in any position and the filling defect will tend to be smooth-margined throughout. Polypoid carcinoma may retain the roentgenologic characteristics of benign tumor throughout the examination. Extrinsic tumors may project into the lumen of the stomach and produce a smooth-margined filling defect that may be difficult to distinguish from that of a benign, intrinsic tumor.

Benign or malignant lesions involving the pylorus and antrum frequently cause obstruction and retention. The same phenomenon may result from extensive cicatrization and narrowing of the duodenum. By placing the patient in the prone position on the horizontal table, slightly on the right side, for from a few minutes to an hour, emptying will become established, the contour of the antrum and pylorus can be visualized and peristalsis studied. An intact contour, with peristalsis passing to the pyloric ring, will indicate that the lesion is on the duodenal side of the pyloric ring. If the lesion is on the gastric side, the type of deformity usually will indicate the type of lesion involving it.

Duodenal ulcer is characterized by deformity of the duodenal cap; an incisura indents the contour of the cap. The deformity predominantly involves the first 3 cm. beyond the pylorus; it may be a narrow, straight-edged filling defect that may be unilateral or bilateral, so shallow as to be difficult of detection, or it may be deep enough practically to bisect the cap. Extensive cicatrization may produce many bizarre patterns, and pouching resulting from this may be misconstrued as diverticula. True diverticula occur in the region of the ampulla of Vater. There is frequently marked shortening of the first portion of the duodenum, and in a definite proportion of

ulcers approximation of the walls will elicit a niche, which indicates the barium-filled crater of the ulcer. The cap may be involved by diffuse duodenitis, with edematous thickening of the walls. In some cases this may produce the characteristic deformity, but in others a rapidly emptying cap of irregular outline may best be typified by the term "irritable." Lesions of the small intestine are of rare occurrence, and sometimes are difficult to elicit by the roentgenoscopic method. The best method is to have the patient ingest a barium meal, and to make frequent observations over a period of one hour.

Lesions of the large intestine are most satisfactorily studied by rectal injection of the contrast medium under fluoroscopic control, with palpatory manipulation of the intestine synchronously with the advance of the medium toward the cecum. In early chronic ulcerative colitis the evidence may be entirely in the rectum; roentgenoscopy has some advantages over proctoscopy when eliciting this evidence, otherwise proctoscopy is preferable in the examination for lesions of the rectum.

Carcinoma is the lesion of the colon most commonly encountered. Any portion of the large intestine may be involved. As in the stomach, three types may be present: the scirrhus or fibrous type, characterized roentgenologically by the napkin ring filling defect, sharp demarcation at both extremities with a narrow fibrous connecting strand; the polypoid type, in which lobulated, cauliflower-like masses project into the lumen and displace the contrast medium by a mottled shadow of lesser density; and the mucoid type, which also reveals the sharply defined dissolution of the contour at each extremity with irregularity and narrowing somewhat similar to that of the scirrhus type, but of greater length and less definition. This type will frequently coincide in situation with a palpable mass. Diverticula are often seen as small lobulations projecting from the margin of the contour. Diverticulitis is confined to the sigmoid colon, and appears as a spindle-shaped shadow, the contours of which are serrated on account of the associated spasm and an inflammatory condition of the wall.

Ulcerative colitis is seen in three types: the diplostreptococcic type, ordinarily termed chronic ulcerative colitis; tuberculous type; and amebic type. Chronic ulcerative colitis commences in

the rectum and involves the colon progressively toward the cecum as a diffuse symmetric narrowing of the intestine and diminished mobility and flexibility. The haustral markings are completely obliterated, the colon is definitely shortened, and the splenic and hepatic flexures have disappeared. The contours may appear uneven, fringed or feathery, owing to extensive destruction of the mucosa, or appear mottled as the result of extensive, diffuse polyposis. In the early stages, the only roentgenologic evidence of the lesion might be local or generalized increase in the intestinal motility expressed as hyperirritability of the colon.

Tuberculous ulcerative colitis commonly involves the ileocecal area, near the ileocecal valve, or the cecum and proximal segments of the colon. Roentgenologically, the features are narrowing, hyperirritability and obliteration of mucosal relief with shortening of the segment. The shadow tends to be ragged, with irregularly arranged jagged prominences and depressions. Hyperplastic tuberculosis is often primary in the intestine, is definitely a tumefactive, granulomatous process, and is confined to a relatively short portion of the intestine, usually the ileocecal coil, and is formative rather than destructive. It should be distinguished from neoplastic and other forms of granulomatous involvement rather than from any of the types of chronic ulcerative colitis.

Amebic colitis most commonly involves the cecum and proximal segments of the colon; secondary sites of preference are dependent portions of the intestine. The ileum is practically never involved, though the cecal aspect of the ileocecal valve is often involved; this results in a gaping orifice due to stiffening of its lips. Obliteration of the haustral markings, shortening and narrowing, sometimes almost to complete closing of the lumen, have been constant in the cecal segment. Slight manipulation of the ileocecal coil when moderate distention of the cecum is present will usually result in a reflux into the terminal portion of the ileum. The roentgenologic aspect of amebic colitis is one of diminished intensity and severity in comparison with that of the other types of chronic ulcerative colitis.

Polypoid lesions of the colon include all sessile or pedunculated growths projecting into the intestinal lumen. The early diagnosis and removal of these is important because of the known ten-

dency to the development of malignant characteristics. Their site of predilection is the rectum and distal segments of the colon. Roentgenologically, they are distinguishable by characteristic mottling produced by multiple central filling defects, the result of the displacement of the contrast medium by the polypoid projections. Their recognition has been materially aided by the adoption of the double contrast method first introduced by Fischer and developed in this country by Weber. Thoroughly efficient preparation is a prerequisite to success with this method. After examination by the opaque enema, the patient is allowed to evacuate the enema and air is introduced under roentgenoscopic control. Enough of the contrast medium will have adhered to the walls of the colon to afford visualization of its intraluminal appearance and bring into bold relief the outlines of the polypoid masses. Stereoscopic roentgenograms of these masses afford excellent opportunity for study. In most lesions of the colon this double contrast method seems to offer a real advance in visualization, and reproductions of these roentgenograms for publication have a quality of detail equal to the finest drawings.

A consideration of the diagnosis of gastrointestinal lesions would not be complete without some reference to cholecystography in the visualization of pathologic change in the gallbladder and gallstones. The oral administration of the dye at The Mayo Clinic has been satisfactory from every angle. Sodium salt of tetraiodophenolphthalein 4 gm., freshly dissolved in 30 c.c. of distilled water, mixed with one glass of grape juice, orange juice, or carbonated mineral water, is taken immediately after a meal at the usual hour in the evening. This meal should be substantial, reasonably free of fats, and fats should be withheld subsequently until the gallbladder has had opportunity to fill with dye-laden bile and to concentrate it. During the period of the examination, the patient should not take purgatives or any medicines which affect the digestive tract. Breakfast is not allowed, but water, black coffee or clear tea is permissible. The first set of roentgenograms is made at 8 a. m. and the second set at 10 a. m. The patient is then instructed to take the usual noon meal, but to include with it a glass of milk and cream in equal parts, and return for the third set of roentgenograms at 1 to 2 p. m. Painstaking technic,

particularly in the avoidance of movements, is a prime requisite. The roentgenographic formula is proportioned to the patient's thickness by measurement. A target-film distance varying from 29 to 25 inches, a kilovoltage from 70 to 95, and an exposure time from half to one second are employed with a standard milliamperage of 80 and a flat Potter-Bucky diaphragm. Complete filling of the gallbladder in the first series, with deepening of the density in the second series and marked shrinking of the volume of the shadow in the third series is interpreted as a normally functioning organ. If there is a uniform lack of density throughout in the visualized shadow of the gallbladder with lessened shrinking of the volume, the organ is reported as poorly functioning. The gallbladder may be visualized as a faint shadow that is of uniform size and density in the films of all series; subsequent examination without administration of dye may prove this to be a nonfunctioning gallbladder with retention or thickness and sometimes calcification in the wall, the primary shadow of the diseased gallbladder. With good visualization of the margin of the liver, the kidney and of the psoas muscle, and with no evidence of a shadow in the gallbladder after administration of the dye and assurance that the patient has followed all instructions, the evidence is interpreted that the gallbladder is nonfunctioning. Gallstones of sufficient size and calcium content can be visualized as often as they were before the advent of the dye. Cholesterin stones of size sufficient to occlude the dye will be visible as negative shadows, areas of decreased density in the homogenous flat density cast by the dye-filled gallbladder. In such cases, the findings are reported as normally functioning, poorly functioning or nonfunctioning gallbladder with stones. Gas in the intestine overlying the gallbladder may simulate negative shadows closely, or may mask the evidence of stones in others. Extraneous shadows, particularly small areas of calcification in the cartilage of the ribs may offer difficulties in interpretation. Further examination is indicated in all such cases. Kirklin, in a considerable number of cases, has been able to distinguish between negative shadows cast by stones and neoplasms of the gallbladder, particularly papillomas, adenomas, fibromas and myomas. Correlation of the cholecystographic observations with the findings in all cases in which operation is performed has established the fact

that lack of appearance of the shadow of the gallbladder is the most accurate of all the findings; that in experienced hands the interpretation of a poorly functioning gallbladder is accurate to a high degree of efficiency, and that of a normally functioning gallbladder is the least accurate from the comparative standpoint, but still infinitely more reliable than any other method known.

I shall not consider here the part played by excretion urography in the delineation of the changes in the normal anatomy and physiology of the genito-urinary tract the result of inflammatory or neoplastic diseases. With these changes, as with those involving the brain, spinal cord, maxillary sinuses, mastoid processes, face, jaw and neck, the roentgenologist is associated with the specialist to whom the general practitioner generally assigns such cases. In this brief summary of what has been accomplished in the development of roentgenology in a little more than three decades, I have perhaps stressed its utility without emphasizing as I should its limitations. In experienced hands roentgenology is without doubt the most accurate and most rapid diagnostic method in cases in which it is applicable. But it will always be subject to the same differences of opinion in interpretation as has been that of macroscopic and microscopic visualization of pathologic changes. Correlation of the roentgenologic with the clinical and laboratory findings is therefore imperative when establishing the final diagnosis. In cases in which differ-

ences of opinion arise, the patient should always be given the benefit of the doubt.

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THE DIAGNOSIS AND TREATMENT OF HAY FEVER WITH ESPECIAL REFERENCE TO MINNESOTA*

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EXCEPTING for the complete avoidance of the pollens responsible for hay fever symptoms by sojourning in an area free of the plants that produce them during the period of flowering, the method of giving prophylactic injections of pollen extract offers the best means of any thus

far advanced for the preventive treatment of hay fever. Some are more successful with this method than others, and, considering the amount of detail involved in its correct and scientific application, it would indeed be strange were it otherwise. The degree of success attained by those who use the method will depend upon the extent to which recognition is given to two cardinal principles of *specific* and *adequate* treatment.

*From the Department of Preventive Medicine and Public Health, the Students' Health Service, and the Department of Botany, University of Minnesota. This research was aided, in part, by funds from the Graduate School of the University of Minnesota.

The first principle involves a *correct* and *complete* diagnosis of each case on the basis of the etiological pollen or pollens. The second principle implies that, the etiological agents having been discovered, an adequate amount of the extracts of these be given to afford relief.

Before attempting the procedure of specific diagnosis it is obviously necessary to acquire a knowledge of the plants that cause hay fever in the environment of the patient. In addition it is imperative to have knowledge of the flowering period of the plants, since it is only at this time that pollen is shed. This information and a small supply of the dried pollens known to be causes of hay fever constitute the essentials of the armamentarium necessary for the diagnosis of the specific causes.

The Diagnosis

Even when one has become thoroughly familiar with the causes of hay fever, the determination of the specific pollen or pollens responsible for the illness of an individual is by no means simple. While correct conclusions may as a rule be reached in the majority of cases by the physician well versed in the hay fever plants of his own region, it is a fact, nevertheless, that such conclusions are always or at least nearly always based upon evidence that is circumstantial. *A positive skin test to a particular pollen does not establish this pollen as an etiological agent of the hay fever condition of the patient upon whom the test was made.* It must be shown, in addition, that the pollen which evokes the reaction is shed at the period during which symptoms occur.

In a previous publication³ we have listed the hay-fever-causing plants for Minnesota, together with the dates of pollination and information concerning the distribution of some of the more important species. One hundred and seventy-four species listed all play some part in the causation of hay fever, albeit they are not of equal importance. It is unsafe, at the present state of our knowledge, to pick out a few species as the most important causes, with a total disregard of the others. However, to consider each of these as separate and distinct causes would make the diagnostic procedure not only extremely tedious, but would render the problem of treatment very difficult. Fortunately there are certain group relationships among the plants which serve to simplify the problem. There is considerable overlapping of antigenic properties

between related species and genera. When, for example, a positive reaction to common ragweed is obtained, the patient invariably reacts to some close relatives, and in our experience almost universally to the giant ragweed, western ragweed, marsh elder, and usually to cocklebur. Although the latter two are sufficiently distinct from the ragweeds and from each other to constitute separate genera, yet their pollens apparently contain a common excitant.

Similar results are obtained with other groups of related plants. Grass-sensitive patients invariably react to many kinds of grasses, and, similarly, a patient sensitive to the pollen of one species of oak reacts to many, probably all kinds of oaks. These results clearly indicate that species sufficiently related to constitute a group of the rank of genus possess a common excitant, and it has been shown in many cases that the exciting agent is common to the larger categories of tribes and even families. Whether, in addition to this common excitant, specific differences also exist is still an open question, and one concerning which there are almost as many opinions as there are investigators. Much work remains to be done before this question can be answered. The immunological overlapping between species and genera clearly warrants attempts to simplify the problem by the method of grouping related species. Ellis and Rosendahl,³ for the purpose of investigation, arranged the 175 species included in their survey into twenty-four groups. Nine of these groups represent subdivisions (tribes) of the grass family and, as might be expected, much immunological overlapping occurs between these groups. From a practical standpoint while we await more definite information on the question of specificities among the grasses, these subdivisions of the grass family may as well be condensed into one. This reduces the total number of groups to sixteen. Chart 1 (adapted from Dahl²) shows the composite pollinating period of the respective groups. An attempt is made to give an idea of the quantity of pollen in the air in relation to season, by giving width as well as length to the line representing the pollinating season. The reader is referred to the paper cited above for detailed information concerning the components of the various groups.

By comparing the period at which symptoms occur in a given patient with Chart 1, one may arrive at a knowledge of the possible causes.

Suppose the symptoms as stated by the patient begin in March and end with frost. Obviously one is obliged to consider as a possible cause all groups of which there are representatives in the flora of the region where the patient resides, and

we have found, by actual determination of the atmospheric content of ragweed pollen, that patients sensitive to ragweed do not uniformly have symptoms during the first days of August, when the amount of pollen in the air is greater than in

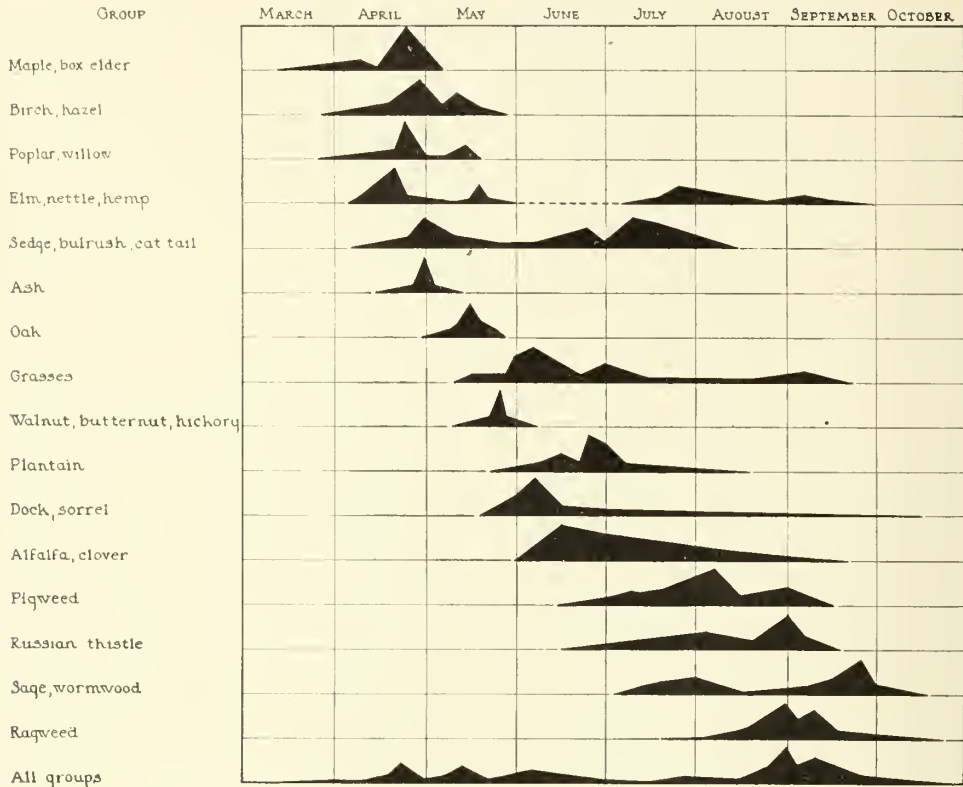


CHART I. DURATION OF POLLINATION TOGETHER WITH TIME OF GREATEST POLLEN PRODUCTION OF EACH GROUP

routine testing must be done with these groups. If the symptoms begin at a later date, let us say August 1, it might seem unnecessary to test for sensitivity to those pollens which make their appearance at an earlier date. Such reasoning is erroneous and leads to many failures in treatment. If we consult Chart 1 we find that the ragweed group begins pollination near August 1 and ends about the middle of October, which is the average date of frost. If now we find by skin tests that the patient is sensitive to the ragweed group we are by no means justified in concluding that it is the sole cause of his hay fever, for the chart also shows that several other groups are shedding pollen during the months of August and September, although these began at earlier dates. The fact that these groups were shedding pollen during a period before symptoms began does not exclude them as contributory causes, for

the latter days of September, yet in the latter period they have severe symptoms. It appears that once the rhinitis is established it takes less pollen to keep it active than it did to incite it, and likewise that a specific pollen not sufficient in itself to incite the symptoms may be a very important contributory cause. Failure to discover and to treat for these contributory causes we believe accounts for the failure to secure complete relief in many of the cases. In order that the diagnosis be complete it is necessary that the patient be tested for all pollens present in the atmosphere coincident with the symptoms.

Test Materials

Dried pollen has much to recommend it as the most satisfactory material for testing. Not only is it the least expensive, but also the most stable. The potency of all extracts diminishes with age,

while dried pollen, if kept dry, may for all practical purposes be considered as completely stable. We have pollens several years old that elicit as strong reactions as pollens collected the past season.

Because of the immunologic overlapping between closely related species constituting a group, we believe that group tests are justifiable, for they reduce the amount of testing to a minimum and furnish information equal in practical value with that obtained with tests done with individual species. If, for example, the patient reacts to a test with a mixture of the ragweed and its relatives little practical value is learned by the application of the component species separately, since reaction will almost without exception be obtained in some measure to all. Even if one wishes to investigate the question of specificity the group testing is a valuable and time-saving preliminary step.

With the majority of the groups the situation is comparable to that of the ragweeds. Exceptions must be made for groups two, four, and five. Group two and five each contain species of two separate and not very closely related families. When these groups are involved in the causation of symptoms in a given patient individual tests with the more important species are necessary as a guide to proper treatment.

The method of testing with dried pollen is simple. A scratch about one-eighth of an inch in length is made in the skin. The flexor surface of the forearm is usually used because of convenience. Upon the scratch is placed a drop of tenth normal sodium hydroxide and a small quantity of dried pollen is then added. The amount of pollen which can be picked up on the small end of a toothpick is an adequate quantity. Reactions appear within a few minutes (15 to 30). A control test should be made simultaneously with the specific tests for comparison. This consists merely of a scratch upon which is placed a drop of the $n/10$ NaOH Solution.

Reading the Tests

A positive reaction usually manifests itself in wheal formation and erythema and frequently is accompanied by itching. However, an amount of wheal formation or erythema exceeding that manifested by the control may usually be considered as a positive reaction. When in doubt concerning a questionable reaction it is wise to repeat the test along with another control.

The all-important fact to be determined from the scratch test is whether it be *positive* or *negative*. The measuring of reactions obtained by this method in terms of centimeters gives no useful information. One frequently sees marked positive reactions upon a patient who gives a history of only a slight hay fever and conversely obtains slight reactions upon other patients who have severe symptoms.

Completing the Diagnosis

With the results of the tests for sensitivity in our hands we are in a position to complete the diagnosis. This is extremely important, for without it the correct specific treatment is impossible. In making the diagnosis we must use the history given by the patient as to the *period during which hay fever symptoms occur*, the results of the skin tests, and the knowledge of the flowering periods of the plants to which positive skin tests were obtained. The procedure can best be illustrated by actual case records.

Case 1.—S. K., male, aged twenty-one years, has had hay fever for the past four years. Symptoms begin about the middle of August and continue until frost. Tested routinely with the 16 groups, he reacted to groups 6 and 16. Consulting Chart 1 we note that group 6 has completed pollination by May 15 and can be dismissed at once as a factor in producing the hay fever symptoms complained of by this patient. The chart shows that group 16 begins to shed pollen about August 1 and continues to do so until the middle of October, that is to say, until the average date of frost. The pollens responsible for his symptoms are in the air approximately two weeks before the symptoms occur, but the quantity is insufficient to produce symptoms. Although we must admit that the evidence is circumstantial, it is a justifiable conclusion that the ragweeds and their close relatives (group 16) are responsible for the symptoms of this patient. Although it seems to be generally believed that this is the usual type of sensitivity found in cases of fall hay fever, it is in our experience the exception rather than the rule. Among 100 cases of hay fever with symptoms during August and September we found that only 5.5 per cent were sensitive to the ragweed group exclusively.

Case 2.—M. B., male, aged twenty-one years, has had hay fever the past two seasons. Symptoms have begun about August 20 and continued until October. Tested routinely with the 16 groups, a single positive reaction was obtained to group 15, the sage wormwood (*artemisia*) group. Reference to Chart 1 reveals that the pollinating period of the group is from the end of the first week in July to October 1. If the reader will refer to the publication of Ellis and Rosendahl³ he will find that this group comprises nine species of *Artemisia*, only one of which produces pollen before August 1. We have learned by studies of the atmospheric content of pollen that the height of pollination of *Artemisia* is

reached after the middle of August. Although some *Artemisia* pollen was in the air before this date the quantity was not sufficient to produce symptoms in this patient.

By the same procedure that attributed the hay fever condition of Case 1 to ragweed we must conclude that the causes of hay fever in Case 2 belong to group 15, the sage-wormwood (*Artemisia*) group. Ellis and Rosendahl have called attention to the apparent neglect of the pollens of this group as causes of hay fever in the upper Mississippi valley.

Case 3.—H. C., male, aged nineteen years, has had hay fever during the past three years. The hay fever symptoms begin in the very last part of July and continue until frost, but the severity is much less after the middle of September. Routine skin testing resulted in positive reactions to groups 6, 13, 14, 15, and 16. Group 6 is immediately eliminated because no pollen is shed later than the middle of May. Although the period of symptoms coincides with those of Cases 1 and 2, one cannot, as in those cases, attribute the condition to a single cause. We must conclude that pollens separately responsible for the hay fever of Cases 1 and 2 are both involved in Case 3. Furthermore, we cannot dismiss groups 13 and 14, since these are both shedding pollen during the period of symptoms in this patient. The fact that these groups (pigweed and Russian thistle) were shedding some pollen as early as the latter part of June does not eliminate them from consideration as important contributory causes during the fall period, for as shown by studies on air pollen content these groups produce pollen abundantly during August and September. We must conclude that this patient has hay fever caused by no less than four separate and distinct groups of plants each antigenically different from the others. This patient received treatment with ragweed extract at a Minneapolis clinic in 1932 with very slight benefit. In 1933 he received treatment with extracts of the four groups mentioned above with 100 per cent relief.

Case 4.—B. F., female, aged forty-five years, has had hay fever for twenty-five years. The symptoms begin in May each year and continue until frost. The most severe period is during August and September. She has had previous treatment with ragweed pollen extract with only partial relief. Skin tests were made with the 16 groups. Positive reactions were obtained with groups 8, 13, 14, 15, and 16. Comparing these numbers with Case 3 it will be observed that these have four groups in common while this case has group 8 additionally. We have in this case causes of hay fever derived from five antigenically separate groups as follows: Grasses, pigweed, Russian thistle, wormwood and ragweed groups. Consulting Chart 1 we find that the grasses begin pollinating in May and therefore coincide with the beginning of symptoms. As the season progresses, not only are more causes added, but the total amount of pollen increases from month to month. The early symptoms here are no doubt due to grasses alone. Toward the latter part of June the pigweed and Russian thistle groups begin to flower. The *Artemisia* and ragweed groups are added during the latter days of July. All of these groups continue

to pollinate until frost, a point which is sometimes overlooked. This patient received specific treatment in 1933 with 100 per cent relief.

Case 5.—F. R. W., female, aged twenty-three years, has had hay fever for the past ten years. She had been previously treated with pollen extract with no appreciable relief. Her symptoms begin the last of May and continue until about September 1. Tests with subgroups (tribes) of the grass family were all positive. A strong positive reaction was also obtained with the pigweed-tumbleweed pollens. The tests were not positive to the Russian thistle or other groups at this time. She received treatment with a mixed grass pollen extract and an extract of pigweed group pollen in 1932 with complete relief. The same treatment was begun in the spring of 1933 and no symptoms occurred until about the middle of July, this in spite of what had been adequate treatment for the specific causes previously determined. It was therefore suspected that a new sensitivity had been developed. Considering the period at which symptoms occurred, it is obvious (Chart 1) that Russian thistle would be most likely involved. Skin tests were made with the discovery of sensitivity to this group, which was not the case a year previously. Extracts of the Russian thistle were therefore added and complete relief was again obtained.

Our purpose in reciting these cases is threefold:

1. To demonstrate the methods of making diagnosis.
2. To emphasize the importance of discovering multiple sensitivity.
3. To bring out the importance of re-testing the cases which fail to respond to a treatment which has previously been successful (Case 5.)

The Choice of Materials for Treatment

Once the diagnosis of the causes has been made the next step is the selection of the treatment extracts. As we have already pointed out, multiple sensitization is the rule rather than the exception, even when the term multiple sensitivity is restricted to unrelated groups.

Within the groups the species are so closely related that reactions as a rule occur to all. The pollens of these closely related species must contain an exciting agent which is common to all. Whether a species may contain a specific excitant in addition to the excitant common to all members of the group, cannot at present be positively stated. Differences of opinion exist and information gained by methods of investigation now extant is inconclusive. Certain general principles should, however, be observed in selecting the materials for the treatment of a particular case.

1. Choose treatment pollen extracts only from those groups which produce positive reactions and to which the patient is known to be clinically sensitive. The latter requirement is fulfilled by occurrence of symptoms during period of pollination.

2. If there are several pollens within a group that occur in the patient's environment, it is advisable in view of the present state of our knowledge to use a mixture of those pollens, the proportions of each to be determined by the relative amounts in the patient's environment.

3. If extracts of single pollen are used (warranted only if extracts fulfilling No. 2 are not obtainable) choose the most important species of the group.

In a previous publication (MINNESOTA MEDICINE, June, 1933) we have given a complete list of the hay-fever-causing plants of Minnesota, and have designated by an asterisk those most important from the standpoint of general occurrence and abundance of distribution. In general, we believe that selecting for treatment the pollens of plants so designated is rational and will give satisfactory results. However, the number of species which may cause hay fever is so large and the distribution so far from uniform that for more exact purposes we recommend the application of principle two, as stated above. To make individualization of the treatment possible the clinician must have available particular information in regard to distribution of the various species. In this connection we are presenting in map form (Plates I, II, III) the distribution of the more important species occurring within the State. In the following pages we present a brief discussion of each of the groups, together with the pollen combinations which in our experience have proven most satisfactory.

I. *The Maple Group—Aceraceæ*.—The maple group has the distinction of opening the hay fever season in Minnesota. The two species chiefly concerned in producing a concentration of about 75 pollen grains per cubic yard of April air are the soft maple and the box elder. Of the two the box elder is by far the most important, partly because of the much heavier pollen production, and partly because it is one of the most commonly planted trees in cities, villages, and farms. It is also a common native tree in the stream and river valleys of the southern half of the state. In treating for this group a pollen mixture of the following composition should be used:

Soft Maple— <i>Acer saccharinum</i>	25 per cent
Box Elder— <i>Acer Negundo</i>	75 per cent

II. *Birch Group—Betulaceæ*.—This group consists of a fairly large number of native shrubs and trees which contribute considerably to the pollen content of the air from early April until about the middle of May. The main period for the Twin City area occurs towards the end of April, when a concentration as high as 125 pollen grains per cubic yard is attained. Several species of the group have a wide distribution and in many places they occur abundantly, yet in our experience the group as a whole is responsible for relatively few hay fever cases.

Pollen combinations recommended for treatment:

Common Hazel— <i>Corylus americana</i>	25 per cent
Ironwood— <i>Ostrya virginiana</i>	25 per cent
Canoe Birch— <i>Betula papyrifera</i>	50 per cent

III. *Poplar—Willow Group—Salicaceæ*.—The Poplars and Cottonwoods are strictly wind pollinated and two or three species constitute the chief pollen producers of the group. The amount of Cottonwood pollen alone reaches the very high concentration of 650 grains per cubic yard of air towards the end of April. The flowers of the Willows, on the other hand, contain nectar glands, and it has been assumed that their pollen is transported by insects and not by wind. In our pollen survey willow pollen has frequently been found on the slides and this fact indicates that these very abundant shrubs and trees cannot be wholly ignored as a possible factor in hay fever causation during the spring season.

Pollen combinations recommended for treatment:

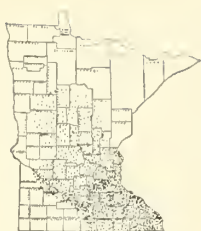
Aspen— <i>Populus tremuloides</i>	25 per cent
Cottonwood— <i>Populus deltoides</i>	50 per cent
Crack Willow— <i>Salix fragilis</i>	25 per cent

IV. *The Elm-Nettle Group—Urticaceæ*.—This is a somewhat diverse group comprising trees and herbs. Our studies thus far strongly suggest an antigenic relationship between the members of the group as at present constituted. Because of diverse constitution the group covers a wide seasonal range extending from early April until the middle of August. The greatest pollen concentration, 450 pollen grains per cubic yard of air, comes about the middle of April and is due to the preponderance of elms as park and boulevard trees in cities and villages of the State and to their very general occurrence as native forest trees. The elm season is comparatively short, but continued presence of the pollens of this group is maintained by a succession of other members. The hackberry and mulberry follow the Elm and these are succeeded by the nettle and hemp.

For the patients sensitive to this group, if the symptoms are confined to April and May, the following combination of pollens are recommended for treatment:

Elm— <i>Ulmus americana</i>	60 per cent
Mulberry— <i>Morus alba</i>	20 per cent
Hackberry— <i>Celtis occidentalis</i>	20 per cent

For the Group 4 sensitive patient who begins with symptoms early in the spring and continues throughout the summer the extracts of the early and late pollinators



SOFT MAPLE
Acer saccharinum



BOX ELDER
Acer Negundo



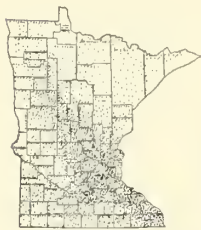
COMMON HAZEL
Corylus americana



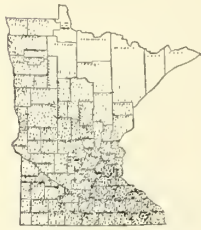
PAPER BIRCH
Betula papyrifera



COTTONWOOD
Populus deltoides



AMERICAN ELM
Ulmus americana



STINGING NETTLE
Urtica gracilis



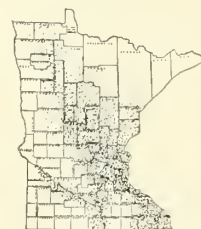
HEMP
Cannabis sativa



LONG-BEAKED SEDGE
Carex longirostris



GREAT BULRUSH
Scirpus validus



BLACK ASH
Fraxinus nigra



BUR OAK
Quercus macrocarpa



HILLS OAK
Quercus ellipsoidalis



RED OAK
Quercus borealis



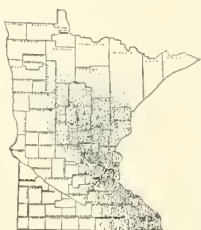
BUTTERNUT
Juglans cinerea



RIB GRASS
Plantago lanceolata



COMMON PLANTAIN
Plantago major



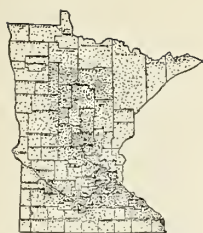
SHEEP SORREL
Rumex acetosella



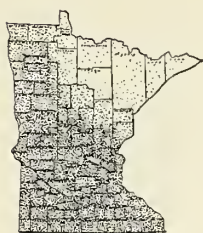
CURLED DOCK
Rumex crispus



PALE DOCK
Rumex mexicanus



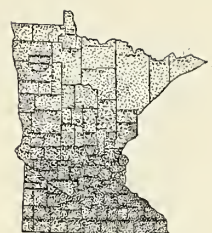
REED CANARY GRASS
Phalaris arundinacea



TIMOTHY
Phleum pratense



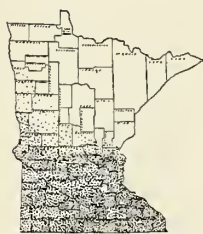
RED TOP
Agrostis alba



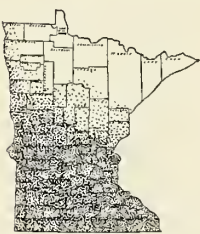
JUNE GRASS
Poa pratensis



HUNGARIAN BROME GRASS
Bromus inermis



ORCHARD GRASS
Dactylis glomerata



RYE
Secale cereale



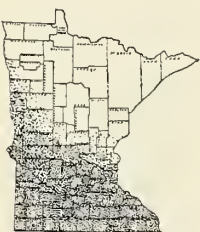
QUACK GRASS
Agropyron repens



NODDING WILD RYE
Elymus canadensis



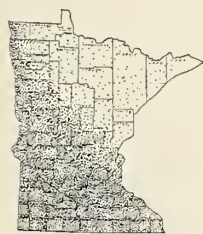
PIGEON GRASS
Setaria glauca



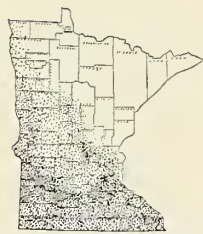
CRAB GRASS
Digitaria sanguinalis



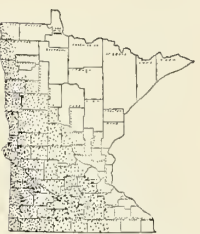
BARNYARD GRASS
Echinochloa Crus-galli



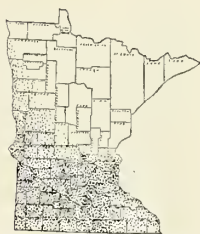
OATS
Avena sativa



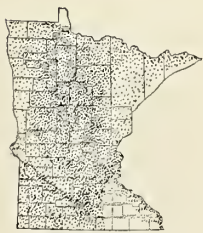
HAIRY MESQUITE GRASS
Bouteloua hirsuta



BECKMANNIA
Beckmannia erucaeformis



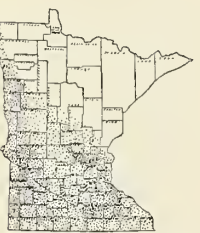
TALL MARSH GRASS
Spartina Michauxiana



WILD RICE
Zizania aquatica



BLUE STEM
Andropogon furcatus



INDIAN GRASS
Sorghastrum nutans



SUDAN GRASS
Andropogon Sorghum var. sudanensis



ALFALFA
Medicago sativa



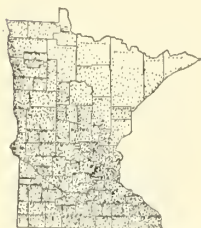
SWEET CLOVER
Melilotus alba



PIGWEED
Amaranthus retroflexus



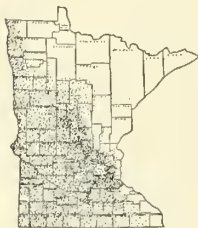
TUMBLEWEED
Amaranthus graecizans



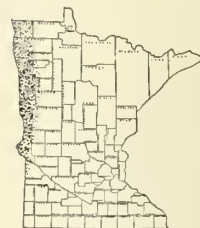
LAMB'S QUARTERS
Chenopodium album



MAPLE-LEAVED GOOSEFOOT
Chenopodium hybridum



RUSSIAN THISTLE
Salsola Kali var. tenuifolia



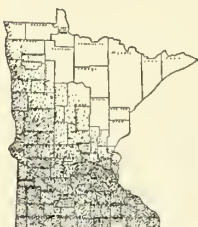
SHAD SCALE
Atriplex patula



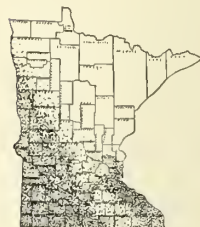
COMMON MUGWORT
Artemisia vulgaris



WILD WORMWOOD
Artemisia caudata



LINEAR-LEAVED WORMWOOD
Artemisia dracunculoides



PASTURE (CARPET) SAGE
Artemisia frigida



PRAIRIE SAGE
Artemisia ludoviciana



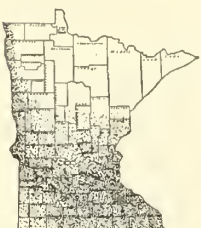
SAW-LEAF WORMWOOD
Artemisia serrata



CANADA WORMWOOD
Artemisia canadensis



WESTERN RAGWEED
Ambrosia psilostachya



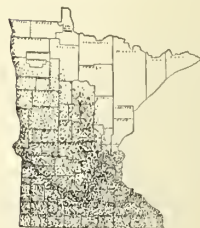
GIANT RAGWEED
Ambrosia trifida



COMMON RAGWEED
Ambrosia artemisiifolia



MARSH ELDER
Iva xanthifolia



COCKLEBUR
Xanthium canadense

may be combined with advantage. The following combination is recommended:

Elm— <i>Ulmus americana</i>	30 per cent
Mulberry— <i>Morus alba</i>	20 per cent
Nettle— <i>Urtica gracilis</i>	20 per cent
Hemp— <i>Cannabis sativa</i>	30 per cent

V. *Sedge-Bulrush Group—Cyperaceæ*.—The group has not hitherto been considered a significant factor in the incidence of hay fever, but in our work sensitivity has been established in a few cases, 19.6 per cent of 300 cases. This fact, considered in connection with the abundant occurrence of the *Cyperaceæ* in many localities of the State and the relatively heavy pollen production of many of the species, indicates that the group should not be ignored in diagnostic tests and treatment. Pollen concentration is certain to be high in the vicinity of lakes, marshes, and moist meadows.

Pollen combination recommended for treatment:

Tussock Sedge— <i>Carex stricta</i>	30 per cent
Long-beaked Sedge— <i>Carex longirostris</i>	30 per cent
Great Bulrush— <i>Scirpus validus</i>	40 per cent

VI. *Ash Group—Oleaceæ*.—Only two species of ash, the green and the black, occur in sufficient abundance in Minnesota to be considered a factor in hay fever causation. Both are common in the hardwood areas of the southeastern and middle parts of the State, while the black ash is also abundant in many places nearly throughout the evergreen forest of the north and northeast. Pollen production is heavy (about 100 grains per cubic yard), but the pollinating period is short, lasting only two to three days in any given locality.

Pollen combination recommended for treatment:

Green Ash— <i>Fraxinus pennsylvanica</i>	50 per cent
Black Ash— <i>Fraxinus nigra</i>	50 per cent

VII. *The Oak Group—Fagaceæ*.—The oaks are represented in the State by eight species, five of which are widely distributed and three of these form in many places almost pure oak thickets and forests. The pollen production is very heavy and about mid-May reaches a concentration of 600 grains per cubic yard.

Pollen combination recommended for treatment:

Bur Oak— <i>Quercus macrocarpa</i>	30 per cent
Hill's Oak— <i>Quercus ellipsoidal</i> is.....	30 per cent
Red Oak— <i>Quercus borealis</i>	20 per cent
White Oak— <i>Quercus alba</i>	20 per cent

VIII. *Grass Groups*.—Patients sensitive to grasses react to a number of different species, but the results of testing are by no means uniform. Grass hay fever is caused by a combination of grasses, the pollination periods of which overlap. The number of species is so great that it would be a well-nigh hopeless problem to treat for all. In our former paper (1) accordingly the grass family was divided into a number of groups based on natural affinity, and it was assumed that some at least of these natural units possessed a definite specificity. In marked contrast to this is the view of Thommen⁸ that satisfactory therapeutic results may be obtained with a single grass pollen extract,

namely timothy, and with this opinion Cooke,⁹ Vander Veer⁹ and others agree. On the other hand, the opinions of Rackemann,⁷ Watson and Kibler,¹⁰ and Piness⁶ are at variance and until there is more universal agreement upon the therapeutic sufficiency of timothy pollen extract as a protection against all other grass pollens, we feel that a much better course to follow is that of the group principle stated above. Theoretical considerations support the use of mixed extracts, and since such an extract is as easily prepared as a single extract there certainly can be no argument against it. We have selected several species of grasses as most important for this region, the basis for selection being, as in the case for the other groups, as follows: (1) These species are widely distributed; (2) they produce pollen abundantly; (3) they overlap in the time of pollination; (4) skin tests to these tend uniformly to excite positive reactions.

This mixture has given excellent results. The species represented and the proportions of pollens are:

1. June Grass— <i>Poa pratensis</i>	60 per cent
2. Timothy— <i>Phleum pratense</i>	10 per cent
3. Brome Grass— <i>Bromus inermis</i>	10 per cent
4. Quack Grass— <i>Agropyron repens</i>	10 per cent
5. Sorghum— <i>Andropogon sorghum</i>	5 per cent
6. Goose Grass— <i>Eleusine indica</i>	2 per cent
7. Corn— <i>Zea Mays</i>	1 per cent
8. Barnyard Grass— <i>Echinochloa crus-galli</i>	1 per cent
9. Sweet Vernal— <i>Anthoxanthum odoratum</i>	1 per cent

This is not offered as the last word in the treatment of hay fever due to grass pollen. Should methods be developed that will clearly demonstrate specificities among the grasses, these must then receive proper attention. Until then the mixture which we propose is more rational than the use of a single extract such as timothy or of mixtures not based upon the local flora.

IX. *Walnut Group—Juglandaceæ*.—The group is composed of four native species of trees which are limited in their occurrence mainly to the southeastern and eastern parts of the State. Only one of these—the butternut—is moderately abundant along the eastern border northward to Pine County and the pollen concentration so far has been found to be light, only about 10 grains per cubic yard. The group may become more significant because the black walnut is being planted considerably along our new highways.

Pollen combination:

Black Walnut— <i>Juglans nigra</i>	25 per cent
Butternut— <i>Juglans cinerea</i>	60 per cent
Bitternut Hickory— <i>Carya cordiformis</i>	15 per cent

X. *The Plantain Group—Plantaginaceæ*.—In some parts of the country the Plantaginaceæ constitute a group of troublesome hay fever plants, but in our work they have proven only of minor importance. Locally the pollen concentration is low, but in some places two members of the group, viz., rib grass and dooryard plantain, are very common weeds of neglected gardens and farm yards and in such situations concentrations sufficiently high to cause serious disturbance are to be expected.

Pollen combinations recommended for treatment:

Rib Grass— <i>Plantago lanceolata</i>	40 per cent
Common Plantain— <i>Plantago major</i>	60 per cent

XI. *The Dock Group—Polygonaceæ*.—This group is made up of a number of species that occur as abundant weeds in the older farming communities of the State. On sandy and acid soils the common sheep sorrel grows in profusion and moreover produces pollen in abundance. The pollens of this group make their appearance in the latter part of May and attain their peak during the first half of June. The importance of these weeds as causes of hay fever is probably greater than has been generally recognized. Approximately 20 per cent of the cases (300) that we have studied are sensitive to this group.

Pollen combination recommended for treatment:

Sheep Sorrel— <i>Rumex acetosella</i>	40 per cent
Curled Dock— <i>Rumex crispus</i>	30 per cent
Pale Dock— <i>Rumex mexicanus</i>	30 per cent

XII. *Alfalfa Group—Leguminosæ*.—Members of the pea family are insect pollinated, but the flowers of certain species are so constructed that pollen is ejected explosively when the nectar-collecting insects touch off a trigger-like mechanism that holds the stamens under tension. The pollen is thrown to a distance of several centimeters and is caught up by passing air currents. Both alfalfa and sweet clover have this explosive pollinating method and both species are extensively cultivated throughout the southern and western parts of the State. Pollen concentration has not been found heavy in the cities, but in the rural districts it is certain to reach significant proportions.

Pollen combination recommended for treatment:

Alfalfa— <i>Medicago sativa</i>	50 per cent
Sweet Clover— <i>Melilotus alba</i>	50 per cent

XIII. *Pigweed Group—Amaranthaceæ*.—This group includes a number of very common weeds of fields, gardens, and vacant lots, and it is involved in approximately 30 per cent of hay fever cases seen at the University of Minnesota Students' Health Service. Of these the common pigweed or redroot (*Amaranthus retroflexus*) is the most important, producing about 50 per cent of the air-borne pollen of the group for the Twin City area. For the same region the tumbleweed (*Amaranthus gracizans*) and the green amaranth (*Amaranthus hybridus*) rank about equal in importance, but considerably behind the Redroot. In the southern part of the State, however, and from thence southward to Oklahoma another member of the group, namely the water hemp (*Acnida tuberculata*) becomes increasingly troublesome.

In treating for this group we have obtained excellent results with a mixture of the following composition:

Redroot— <i>Amaranthus retroflexus</i>	50 per cent
Tumbleweed— <i>Amaranthus gracizans</i>	25 per cent
Green Amaranth— <i>Amaranthus hybridus</i>	25 per cent

XIV. *Russian Thistle Group—Chenopodiaceæ*.—Several species of this group occur widely throughout the State, while others are somewhat localized yet they

are generally abundant in their respective areas. As in the preceding group several members of it are especially obnoxious because of their preference for rich garden soils and saline spots of barnyards. Some, like the Russian Thistle, are very aggressive and quickly take complete possession of such newly bared areas as road-cuts and fills, sand dunes and fallow fields. The burning bush or kochia is rapidly becoming a favorite ornamental plant of the ubiquitous filling station.

Pollen combination:

Lambs Quarter— <i>Chenopodium album</i>	30 per cent
Maple-leaved Goosefoot— <i>Chenopodium hybridum</i>	20 per cent
Russian Thistle— <i>Salsola Kali</i> var. <i>tenuifolia</i>	30 per cent
Burning Bush— <i>Kochia scoparia</i>	20 per cent

XV. *Sage-Wormwood Group—Compositæ*.—The importance of the recognition of this group as one of the primary factors in the causation of autumn hay fever in the upper Mississippi valley has been dealt with in two of our previous papers.^{3, 4} Subsequent clinical experience has further emphasized the need of diagnosis and treatment for members of the group independently of the ragweeds.

Pollen combination recommended:

Dragon Sage— <i>Artemisia dracunculoides</i>	40 per cent
Prairie Sage— <i>Artemisia ludoviciana</i>	20 per cent
Mugwort— <i>Artemisia vulgaris</i>	20 per cent
Pasture (carpet) Sage— <i>Artemisia frigida</i>	20 per cent

XVI. *Ragweed Group—Ambrosiaceæ*.—The group continues to hold its unenviable front rank position in the causation of hay fever in the State and it is disconcerting to find that all members of the group are becoming more abundant in most places, and that several species are extending their range and are becoming established in localities where they were formerly unknown. The northward migration of the ragweeds is due to a combination of factors, chief of which are the extension and multiplication of highways, greatly increased traffic and a succession of dry, warm summers. The latter would permit the growth and maturation of these weeds where formerly the temperature was too low or the season too short for seed development.

Pollen combination recommended for treatment:

Common Ragweed— <i>Ambrosia artemisiifolia</i>	50 per cent
Giant Ragweed— <i>Ambrosia trifida</i>	25 per cent
Western Ragweed— <i>Ambrosia psilostachya</i>	10 per cent
Marsh Elder— <i>Iva xanthifolia</i>	10 per cent
Cocklebur— <i>Xanthium canadense</i>	5 per cent

Treatment

Prophylactic.—As we have previously pointed out, adequate treatment necessitates the use of extracts from all pollen groups which are responsible for the hay fever of the individual patient. If some are left out the treatment is only partial and partial relief only can be expected. Having decided which pollen extracts are to be used in treatment there is left for consideration

TABLE I. CLASSIFICATION OF SENSITIVITY

Solution No.	1	2	3	4
Concentration c.c. Pollen Unit (Pollen Dilution) (Mg. Pollen) Mg. Protein Mg. Nitrogen	10. (1-100,000) (.01) .001 .0001	100. (1-10,000) (.1) .01 .001	1000. (1-1000) (1.) .1 .01	10000. (1-100) (10.) 1. .1
Class	Reaction	Reaction	Reaction	Reaction
A	Marked	Marked +	Marked +	
B	Moderate	Marked	Marked	
C		Moderate	Moderate	
D		.		Marked or Moderate

only the question of dosage. This must also be adequate. Unfortunately no dosage schedules can be set up which will meet the requirements of all individuals as is possible, for example, with the toxoid for immunizing against diphtheria. Not only do individuals vary to an extreme degree as to the amounts necessary to bring relief, but also in the amounts which they can tolerate. The maximum dose which may be given safely to one individual may be a very hazardous one, even fatal, to another. In endeavoring to give adequate treatment it is proper to aim at as high a dosage as can be given without untoward effects.

In any case the treatment must be begun with a relatively small dose and increased at each succeeding injection until a maximum is reached. Obviously in order that such procedure may be carried out, some sort of standardization of the extract used is required. It is unfortunate that manufacturers of pollen extracts use different methods of standardization. Whether one of these methods is superior to others is still disputed. Some are standardized in terms of pollen units, others in terms of total nitrogen content, and still others in terms of protein nitrogen. Satisfactory results can be obtained with extracts standardized by various methods. It is advisable, however, to adopt one and adhere to it to avoid the confusion in dosage schedules consequent upon the use of extracts standardized by different methods. In selecting a brand of extracts avoid those which are marketed only in fixed doses (packages of individual doses), since these require that all patients shall receive an identical amount of treatment. Select a product which permits a determination of the degree of sensitivity of the patient and of a corresponding varia-

tion in the size of the successive doses. By whatever method the extract be standardized one can not intelligently start the treatment until by quantitative tests the degree of sensitivity of the patient to the extract to be used has been ascertained. This is determined by intracutaneous injections of appropriate dilutions. A generally accepted rule for a safe initial dose is 0.1 c.c. of the strongest dilution giving a moderate (not marked) positive reaction. Cooke has prepared a convenient classification of patients into four groups, Class A being the most sensitive and Class D the least. The solutions used by him were standardized in terms of nitrogen content, the test extracts containing .0001, .001, .01, and .1 mg. respectively of nitrogen per c.c. The last three dilutions make ideal treatment dilutions and can therefore be used for both purposes. For practical purposes comparable dilutions of extracts based on pollen units would contain 10 units, 100 units, 1,000 units, and 10,000 respectively.

Comparable dilutions based on pollen protein would contain .0005, .005, .05, and .5 mg. of pollen protein per c.c.

The quantitative test is made by injecting into the skin preferably on the flexor surface of the forearm .02 c.c. of the test solutions. In actual practice it is best to test first with the two weakest dilutions. After five to ten minutes, readings are taken and it can then be determined whether it is necessary to make further tests. Adherence to this practice will avoid many unpleasant reactions.

In Table I appears a convenient scheme for classification of the patient according to sensitivity. A reaction is considered *moderate* when

TABLE II

CLASS										A					B					C					D				
Dose No.	Multiple of 1st Dose	Solution No.	Dose in c.c.	Pollen Unit	Mg. Pollen	Mg. Pollen	Mg. Protein	Mg. Nitrogen		Solution No.	Dose in c.c.	Pollen Units	Mg. Pollen	Mg. Protein	Mg. Nitrogen	Solution No.	Dose in c.c.	Pollen Units	Mg. Pollen	Mg. Protein	Mg. Nitrogen	Solution No.	Dose in c.c.	Pollen Units	Mg. Pollen	Mg. Protein	Mg. Nitrogen		
1	1	1	2	.05	5	.005	.0005	.00005		2	1	10	.01	.001	.0001	2	2	20	.02	.002	.0002	3	.05	50	.05	.005	.0005		
2	2	2	1	10	.01	.001	.0001	.0001		2	2	20	.02	.002	.0002	2	4	40	.04	.004	.0004	3	1	100	.1	.01	.001		
3	4	2	2	20	.02	.002	.0002	.0002		2	4	40	.05	.004	.0004	2	8	80	.08	.008	.0008	3	2	200	.2	.02	.002		
4	7	2	.35	35	.035	.0035	.00035	.00035		2	7	70	.07	.007	.0007	3	14	140	.14	.014	.0014	3	.35	350	.35	.035	.0035		
5	10	2	.5	50	.05	.005	.0005	.0005		3	1	100	.1	.01	.001	3	2	200	.2	.02	.002	3	.5	500	.5	.05	.005		
6	15	2	.75	75	.075	.0075	.00075	.00075		3	1.5	150	.15	.015	.0015	3	3	300	.3	.03	.003	3	.75	750	.75	.075	.0075		
7	20	3	1	100	.1	.01	.001	.001		3	2	200	.2	.02	.002	3	4	400	.4	.04	.004	4	1	1000	1	.1	.01		
8	30	3	.15	150	.15	.015	.0015	.0015		3	3	300	.3	.03	.003	3	6	600	.6	.06	.006	4	.15	1500	1.5	.15	.015		
9	40	3	.2	200	.2	.02	.002	.002		3	4	400	.4	.04	.004	3	8	800	.8	.08	.008	4	2	2000	2	.2	.02		
10	60	3	.3	300	.3	.03	.003	.003		3	6	600	.6	.06	.006	4	12	1200	1.2	.12	.012	4	3	3000	3	.3	.03		
11	80	3	.4	400	.4	.04	.004	.004		3	8	800	.8	.08	.008	4	16	1600	1.6	.16	.016	4	4	4000	4	.4	.04		
12	100	3	.5	500	.5	.05	.005	.005		4	1	1000	1	.1	.01	4	2	2000	2	.2	.02	4	5	5000	5	.5	.05		
13	120	3	.6	600	.6	.06	.006	.006		4	1.2	1200	1.2	.12	.012	4	24	2400	2.4	.24	.024	4	6	6000	6	.6	.06		
14	150	3	.75	750	.75	.075	.0075	.0075		4	1.5	1500	1.5	.15	.015	4	38	3800	3	.3	.03	4	.75	7500	7.5	.75	.075		
15	180	3	.9	900	.9	.09	.009	.009		4	1.8	1800	1.8	.18	.018	4	36	3600	3.6	.36	.036	4	9	9000	9	.9	.09		
16	200	4	1	1000	1	.1	.01	.01		4	2	2000	2	.2	.02	4	4	4000	4	.4	.04	4	1	10000	10	1	.1		
17	240	4	1.2	1200	1.2	.12	.012	.012		4	2.4	2400	2.4	.24	.024	4	44	4800	4.8	.48	.048	5*	.6	12000	12	1.2	.12		
18	280	4	1.4	1400	1.4	.14	.014	.014		4	2.8	2800	2.8	.28	.028	4	56	5600	5.6	.56	.056	5	7	14000	14	1.4	.14		
19	320	4	1.6	1600	1.6	.16	.016	.016		4	3.2	3200	3.2	.32	.032	4	64	6400	6.4	.64	.064	5	8	16000	16	1.6	.16		
20	360	4	1.8	1800	1.8	.18	.018	.018		4	3.6	3600	3.6	.36	.036	4	72	7200	7.2	.72	.072	5	9	18000	18	1.8	.18		
21	400	4	2	2000	2	.2	.02	.02		4	4	4000	4	.4	.04	4	8	8000	8	.80	.08	5	1	20000	20	2	.2		

5* = Twice strength of No. 4.

there is definite increase in the size of the wheal produced by the intradermal injection, the outline remaining smooth and surrounded by an area of erythema. A *marked* reaction is characterized by distinct pseudopod formation rendering the outline of the wheal irregular. A *marked plus* reaction differs from a marked reaction only in size, spreading over a large area.

Dosage.—In the prophylactic treatment the aim should be to attain as large a dose as the patient can tolerate without untoward effects. Having classified the patient as to sensitivity it is necessary to have a tentative dosage schedule. The dose must, of course, be increased gradually. As a rule the tolerance dose may be reached in fifteen to twenty doses. The first five or six doses are quite small, and if desired may be given at two or three day intervals. As the size of the dose increases, a longer interval, five to seven days, is desirable to avoid cumulative effects. In Table II appears a suggested dose schedule for the various classes of sensitivity. Dosage is shown for extracts standardized by four methods commonly in use. We do not mean to imply that the dose of an extract standardized by one is identical with another. However, the dose of one is roughly comparable to the other. The scheduled rate of increase is tentative only, having been found by experience to be justified in the majority of cases. If unpleasant reactions occur the physician must exercise judgment and individualize his dosage. If one uses dilutions of the strength suggested in Table I designated by numbers 2, 3, and 4 flexibility is provided.

When the patient is sensitive to more than one group of unrelated pollens success can be attained only if an *adequate* dose is reached in the case of *each* extract. This obviously calls for considerable caution and exercise of judgment. When two or three different extracts are to be given simultaneously it will usually be advisable to reduce the dose of each somewhat below that which would be used if each extract were to be given singly. In this case a greater number of doses will be required to reach an adequate dosage of each.

Reactions.—If proper attention is given the matter of dosage based upon a classification of the sensitivity of the patient, alarming constitutional reactions will be infrequent. Even with the utmost care in dosage the amount of extract injected may occasionally exceed the tolerance of

TABLE III. DOSAGE SCHEDULE FOR PHYLACTIC TREATMENT OF A "C" CLASS PATIENT

Day	Dose Number	Solution Number	Dose c.c.	Pollen Units	Mg. Nitrogen
1	1	2	.1	10	.0001
2	2	2	.12	12	.00012
3	3	2	.144	14.4	.000144
4	4	2	.17	17	.00017
5	5	2	.2	20	.0002
6	None				
7	6	2	.24	24	.00024
8	None				
9	7	2	.3	30	.0003
10	None				
11	8	2	.36	36	.00036
12	None				
13	9	2	.43	43	.00043
14	None				
15	10	2	.5	50	.0005
16	None				
17	None				
18	11	2	.6	60	.0006
19	None				
20	None				
21	12	2	.72	72	.00072
22	None				
23	None				
24	15	2	.86	86	.00086
25	None				
26	None				
27	16	2	.93	93	.00093
28	None				
29 & 30	17	2	1.11	111	.0011

the shock organ if this is rapidly absorbed and an constitutional reaction may result immediately. It is conceivable that in giving a subdermal injection one might occasionally puncture a small vein and thus deliver the entire content of the syringe directly into the blood stream. To guard against this possibility Duke advises placing a tourniquet above the injection site. To further insure a not too rapid absorption it is advisable to mix with each dose of extract about 0.1 c.c. of epinephrin (1-1,000). When blanching of the tissues occurs at the injected area the tourniquet is removed.

Symptoms such as sneezing, coughing, itching of the skin, lachrymation, or asthma following an injection deserve serious consideration and measures should be immediately instituted to check the reaction. It is advisable to apply a tourniquet proximal to the injection site. For the control of the symptoms epinephrin is easily

the most valuable agent. One-fourth to one-half c.c. if given promptly will usually be sufficient. Part of the dose should be injected into the site of the pollen injection. When the symptoms have subsided the tourniquet may be removed, but should be replaced immediately if symptoms recur. *Under no circumstances should an injection of pollen extract be made unless adrenalin is at hand.* After adrenalin has checked the advance of the attack morphin sulphate in proper amount, depending upon age or weight of the patient, is a valuable adjuvant and calms the mental and physical distress attending the reaction and the often unpleasant effects of the adrenalin as well.

Phylactic.—Many patients do not seek treatment until the pollen season and its consequent symptoms have already begun. Although the pre-seasonal treatment is the method of choice, excellent results are frequently obtained with co-seasonal administration of pollen extracts. While the mechanism of relief is no doubt the same in the two methods the application of the co-seasonal treatment differs because of certain important considerations from that outlined for the pre-seasonal cases. First, because the symptoms have already appeared, one desires to attain the dosage necessary for protection as quickly as possible *with safety*. Because of the time element the usual interval between doses as in the pre-seasonal method is shortened and the danger of cumulative effects arises. Second, in the pre-seasonal treatment the occurrence of symptoms such as sneezing, lachrymation, etc., indicate an overdose and, therefore, serve as an important guide to subsequent dosage. In co-seasonal treatment this important guide is not available, since the constitutional symptoms when they occur cannot be distinguished from the symptoms due to exposure to pollen in the air. Third, because a certain variable but by no means insignificant amount of pollen excitant is being absorbed from air-borne pollen by the exposed mucous membranes, the dosage cannot be exactly controlled and constitutional symptoms are more difficult to avoid.

Because of the foregoing considerations it is obvious that unpleasant, not to say dangerous, constitutional reactions will be more difficult to avoid. The following procedure has been found useful in our hands:

1. The patient is classified as to sensitivity to the pollen extracts which are to be used in treat-

ment in the manner described for pre-seasonal treatment.

2. The initial dose of that scheduled (Table II) for the class next below that of the patient's own classification is used as a starting point. The treatments are given daily and each dose is increased by 20 per cent over that of the preceding for the first five doses. The next five doses are given every third day, maintaining the same per cent increase as before. In this manner the tenth dose will be reached on the fifteenth day. After this time the dose interval may be increased to every fourth day as a precaution against reactions due to cumulative effects.

It is not to be expected that any dosage schedule can be rigidly and inflexibly adhered to. Marked local and constitutional reactions call for a reduction of the quantity injected to at least one-half that of the preceding dose and also for caution in increasing the subsequent doses.

"Rush" Desensitization.—This method advocated and practiced by Freeman⁵ consists of giving injections of pollen extracts at intervals of one and one-half to two hours throughout the day. "The patient must go into a hospital, or some such institution, or at any rate he must be in the charge of a trained nurse and under constant supervision of the doctor . . ." He likens the "Rush" desensitization to the antianaphylaxis method of Besredka.¹

This method is fraught with extreme danger. The only advantage offered by it is the element of time saved, and this hardly seems a sufficient reason for chancing the extreme dangers inherent in the method. A less intensive method is therefore to be preferred. If certain fundamentals are given consideration a gradual but safe increase in dosage can be maintained.

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THE CONTROL OF TUBERCULOSIS—ITS ECONOMIC AND SCIENTIFIC FACTORS*

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MEDIEVAL Europe knew that leprosy was communicable and that its spread could be stopped if contact with the sick person could be prevented. In 1313, Philip the Fair ordered all lepers burned. This drastic measure was not carried out. Instead the lepers were segregated in monasteries called lazarettos, of which there were 19,000 in Europe. In two hundred years leprosy almost disappeared.⁹

This represents Europe's first conquest of a pestilence and should give all of us who are attempting to control tuberculosis much food for thought. Perhaps by considering what has happened to tuberculosis in the last two hundred years, we can better evaluate what we are learning today and better plan our future program.

In 1741 it is estimated that 1 in 5.5 deaths⁷ in London was due to tuberculosis. About this time machinery was introduced in industry, and its use brought about a rather abrupt shift in the population from the country to the town, with the resultant over-crowding of people and an exploitation of labor, particularly of children, who were often forced to work twelve to fifteen hours a day at starvation wages. This condition was accompanied by an increase in the ratio of deaths from tuberculosis so that by 1799 it is estimated that 1 in 3.8⁷ deaths was due to this disease (Table 1). London at this time was a veritable labyrinth of squalor and destitution. The principal thoroughfares were, for the most part, unpaved and full of mud puddles and filth, while the alleys and courts were inhabited by a vast fraternity of social outcasts so that contamination and disease flourished. Conditions became so

TABLE I. DEATH RATE IN TUBERCULOSIS

Year	Place	Ratio of Tuberculous Deaths to Total Deaths	Rate per 100,000
1741	London	1— 5.5	
1799	London	1— 3.8	
1860	England	1— 8	
1910	England	1—10	
1851	New York City		469
1930	New York City		73
1904	Registration area		201
1932	Registration area		63

intolerable that legislation was enacted to curb the exploitation of labor and to improve living conditions. In the next sixty years the ratio of tuberculosis deaths fell to 1 in 8. In the next fifty years, or by 1910, the deaths from tuberculosis were further reduced in England to 1 in 10. This last reduction when figured on the basis of population represented a 50 per cent decrease per 100,000.³ In the United States, the death rate from tuberculosis in New York City in 1851 was 469 per 100,000 while in 1930 it was only 73. In the registration area, the death rate was 201 per 100,000 in 1904 but in 1932 it was only 63. In Minnesota in 1932 only 1 death in 25 was due to tuberculosis.

The decline in the death rate from tuberculosis in the nineteenth century took place during the period when there was a marked increase in urbanization of the population following the industrial revolution. This condition in itself increases the opportunities of infection, and, if infection lowers one's resistance to subsequent in-

*Presidential address presented before the Mississippi Valley Conference on Tuberculosis, Kansas City, Missouri, October 6, 1933.

fection, then tuberculosis mortality should have increased markedly during this period. Instead it decreased tremendously. Furthermore, history indicates very clearly that, as living and working conditions improve, tuberculosis mortality decreases, and when they are poor, such as during major depressions or prolonged wars, tuberculosis mortality increases. In this depression, however, the death rate continues to decline and in Minneapolis there were one hundred fewer new cases of tuberculosis reported to the Health Department in 1932 than in 1931. Also, according to Asher,¹ the tuberculosis death rate continues to decline in Germany in spite of the prolonged depression while the incidence of infection in adults remains high, 100 per cent, according to the tuberculin test. Apparently, then, the relief work carried on so far during this depression plus the enforced rest of so many adults has operated to increase man's resistance to tuberculosis. Infection is not prevented, but it is rendered harmless. There have been two very interesting interruptions of this continuous decline connected with wars. One occurred during the siege of Paris in 1870³ and the years immediately following it. When normal living conditions were reestablished, the death rate returned to normal. The second interruption occurred in Europe following the World War. Again when normal conditions were reestablished, the death rate began to fall and it has been declining ever since.

Thus the first great cause of the decline in the tuberculosis death rate in the last two hundred years is probably economic. Certainly if rest and adequate food are effective in the treatment of tuberculosis, it follows that reducing the strain and providing adequate food for the person in industry should increase his resistance against whatever infection he may have, be it little or great.

Also Dublin⁶ reports that in 1930 the death rate from all forms of tuberculosis among the industrial policy holders of the Metropolitan Life Insurance Company was 81.3 per 100,000 in contrast to 17 per 100,000 among those economically able to carry individual policies of \$5,000.00 or more. Because of this, Dublin claims that, by and large, tuberculosis is rapidly becoming a minor cause of death in all but the industrial groups, and even in that group the decline in the death rate in the last twenty years has been greater (64 per cent) than for the nation as a

whole (52 per cent), or for any other major population such as the rural group (41 per cent). Curiously enough, the industrial group exposed to silica dust, a substance which lowers the individual's natural resistance to tuberculosis, has a higher tuberculosis death rate than the group with the greatest exposure to infection, such as physicians and nurses. Another group having high rates consists of the common laborers, where the work is hard and the pay low.

Osler's¹² parable of the sower illustrates the influence of resistance or "the nature of the ground upon which the seed falls. *'Some seeds fell by the wayside and the fowls of the air came and devoured them up,'*—bacilli scattered broadcast outside the body, an immense majority of which die; *'some fell on stony places'*—bacilli that find lodgment in many of us with the production of a small focus, but nothing comes of it; they wither away because they have no root; *'some fell among thorns and the thorns sprang up and choked them'*—cases of tuberculosis, latent or active, in which the seed finds the soil suitable and grows, but the conditions are not favorable, as the thorns, representing the protective forces of the body, get the better in the struggle; *'but others fell on good ground and sprang up and bear fruit an hundred fold,'* representing the 54,435 who died of the disease in 1909 in England—the soil suitable, protecting forces feeble."

The second great cause of the decline in the death rate from tuberculosis is scientific and lies in the reduction of the opportunities of infection in the general population due to (1) hospitalization of the tuberculous; and (2) pasteurization of milk and eradication of tuberculosis from our herds as a result of our cattle testing program. "These two forces reduce the amount of tuberculosis and deaths in accordance with the laws which govern communicable diseases. Take away the seed, thus thinning out the seeding, and the disease diminishes."

The influence of hospitalization on this part of the control program is well illustrated by the following. Hospital facilities for the tuberculous were begun in England in 1791, and by 1884 England had 7,000 beds for this purpose. Between 1838 and 1900 the death rate dropped 66.7 per cent while between 1884 and 1900 it dropped 22.4 per cent in London alone. Sanatorium treatment was begun in Germany in 1854, and between 1869 and 1900 the death rate dropped

TABLE II. EFFECT OF HOSPITALIZATION ON THE DEATH RATE IN TUBERCULOSIS

Place	Hospital or Sanatorium Facilities	Year	Death Rate per 100,000	Percentage Increase	Percentage Decrease
England	Began in 1791 (7,000 beds by 1884)	1838	399		66.7
London		1900	133		
		1884	312		22.4
		1900	242		
Germany	Began in 1859	1869	353		24.3
Berlin		1900	267		
France	Three small hospitals prior to 1901 First large Sanatorium in 1905	1884 1900	519 546	4.9	
Paris					
United States	Began in 1881 (increased rapidly)	1884	445		32.4
New York		1900	301		

24.3 per cent in the city of Berlin alone. New York began its hospitalization for the tuberculous in 1881, and between 1884 and 1900 the death rate had fallen 32.4 per cent. While the death rate was declining in these communities, it rose 4.9 per cent in Paris, where there were only meager sanatorium facilities⁸ (Table II).

The life history of the tuberculous individual can be divided into two broad phases: the period before he becomes infectious and the period after he has become infectious. In any program dealing with the control of tuberculosis one must decide whether he will concentrate on the first, or second, or include both phases of the individual's life. Because of the marked advance made in the diagnosis of tuberculosis by medical science in the nineteenth century, it seemed very logical to the founders of the National Tuberculosis Association to concentrate on the first phase. They thought if the active cases could be found before they became infectious and restored to health by means of sanatorium treatment that the chain of infection would be broken and in time tuberculosis would automatically disappear. To that end the building of sanatoria was encouraged until in 1931 there were 633 institutions in the United States with 80,054 beds for the tuberculous.

The difficulties in carrying out that plan were: (1) the universality of tuberculous infection in adults; (2) the fact that only a small proportion (1 to 10 per cent) of those infected ever develop tuberculosis; (3) the difficulty in selecting the exact point or the time in which infection passes from infection only, to disease. This process is so insidious that the majority of cases are advanced before they are discovered. For

instance, only 9 per cent of those with pulmonary tuberculosis admitted to Glen Lake Sanatorium since it opened have been in the early stage. If our experience can be considered indicative of general conditions, then the majority of patients admitted to our sanatoria are in the open, infectious group.

Thus it would seem wiser to follow Koch's suggestion made in 1906 when he recommended that the policy Norway used in controlling leprosy be followed in the control of pulmonary tuberculosis. "There (in Norway) they have not isolated all of the lepers but only a fraction of them, including first just the most dangerous, and the result has been that the number of lepers, which in 1856 amounted to nearly 3,000, has now (1906) gone down to 150. This is the example to be followed in pulmonary tuberculosis, and, if all of the cases of pulmonary tuberculosis cannot be provided for, at least as many as possible, including the most dangerous, that is to say, those in the last stages of the disease, ought to be lodged in hospitals."¹³

If Koch's suggestion is correct, then any community which has provided ample sanatorium facilities should have a more rapidly declining tuberculosis death rate than other similar communities with less ample facilities. In 1927, when our present sanatorium capacity was reached, Minneapolis had 2.25 beds per death, but the declining death rate since then now gives us 3.6 beds per death (Table III), while the State as a whole, including Federal facilities, has a little over 2.5 beds per death for the tuberculous. In 1916, the year the Sanatorium was opened, the tuberculosis death rate in Minneapolis was 38.6 per cent greater than for the

TABLE III. RATIO OF BEDS TO DEATHS FROM
TUBERCULOSIS

Year	Beds	Deaths	Ratio
1916	230	521	.44
1927	760	337	2.25
1932	760	207	3.6

TABLE IV. DEATH RATE

Locality	1916	1932	Reduction (per cent)
Minneapolis	147.14	42.97	70.79
State	106.07	40.65	61.67

State as a whole but in 1932 it was only 5.4 per cent greater (Table IV). Thus the tuberculosis death rate is declining faster in Minneapolis, the largest city of the State, than in the entire State in spite of the fact that tuberculosis is notoriously a disease of the cities rather than of the rural section.

The incidence of teen age tuberculosis in Minneapolis is very low, as is seen by the fact that 26, or 5.35 per cent, of the 486 tuberculous individuals admitted to Glen Lake Sanatorium in 1925 were between the ages of fifteen and nineteen while only 12 or 2.5 per cent of the 470 tuberculous individuals admitted in 1932 were in this same age group. Also, the death rate of individuals from fifteen to nineteen years of age is much lower in Minneapolis than for the registration area (Table V). For instance, in 1920 the tuberculosis death rate in Minneapolis for males in this teen age group was only 24.7 per 100,000 or about 35.3 per cent of that for the registration area.¹¹ The death rate for females in Minneapolis in this age group was 70 or about 53.2 per cent of that for females in the registration area. A decade later, in 1930, the death rate for males in Minneapolis in that age group had dropped to 10.8 per 100,000 or 29 per cent of that of the registration area while the death rate for females in that age group had dropped to 13.5 or about 20 per cent of that of the registration area (Table VI). Thus in the decade which coincided with the increase in the capacity of the Sanatorium from one hundred to seven hundred beds the already existing favorable ratio of deaths from tuberculosis in the teen age group

in Minneapolis as compared with the registration area of the United States was increased.

Drolet⁴ reports that the death rate of infants in New York City in 1923 was only one-twelfth of what it was in 1868, and that the death rate for children under fifteen years of age has declined from 136 per 100,000 children in 1898 to 20 per 100,000 children in 1931.⁵ He believes that the segregation of the advanced case is the chief cause of this marked decline and claims that the death rate from tuberculous meningitis and the total number of cases segregated in institutions are in obvious correlation. He believes also that the activities of the Health Department such as the systematic disinfecting, cleaning and renovating of the former homes of the consumptives, the pasteurization of milk and the examination of all food handlers are very important contributing factors.

If the experience of Norway and medieval Europe with leprosy, the early experience of London, Berlin, New York and Paris with tuberculosis and the experience of New York City in the twentieth century as cited by Drolet can be considered as an indication of cause and effect, then the more rapid decline in the tuberculosis death rate in Minneapolis as compared with the State as a whole and the lower incidence of teen age tuberculosis in Minneapolis as compared with the registration area is just what one would expect from the ample sanatorium facilities which the community has provided. It proves beyond a peradventure of a doubt that such facilities are worthwhile and that they more than pay for themselves.

But providing ample sanatorium facilities and depending upon the education of the public concerning the symptoms of tuberculosis are not enough. In the first six months of 1933 in the State of Minnesota,² 48 per cent, and in the city of Minneapolis, 50 per cent, of the deaths from pulmonary tuberculosis were either reported by death certificate alone or occurred within five to six months after the first registration. Apparently, then, it is necessary if we really wish to control tuberculosis to go out after the cases and thus cover both phases of the consumptive's life. In searching out the cases we should center our program about five groups: (1) the industrial; (2) the family; (3) the contacts of those who have died from tuberculosis; (4) the school; and (5) the family physician. The first three plans

TABLE V. TUBERCULOSIS MORTALITY FOR YOUNG MALES AND FEMALES
Registration States of 1900, 1900-1930

Year	15-19 Years			20-24 Years		
	Rate per 100,000 population		Percentage excess of female over male rate	Rate per 100,000 population		Percentage excess of female over male rate
	Male	Female		Male	Female	
1900	124.1	177.7	43	249.7	265.8	6
1910	111.1	133.0	20	190.9	204.0	7
1920	79.0	131.6	67	137.9	179.4	30
1930	37.4	67.3	80	76.6	103.6	35

TABLE VI. DEATH RATE IN AGE GROUP 15-19 YEARS OF AGE PER 100,000 POPULATION
OF THAT AGE GROUP

Year	Males			Females		
	Registration Area	Minneapolis	Per cent	Registration Area	Minneapolis	Per cent
1920	79	24.7	35.3	131.6	70	53.2
1930	37.4	10.8	29	67.3	13.5	20

start from the known case and proceed to the contacts. The fourth plan starts with the contacts and leads to the unknown case. In that connection, Harrington¹² reports that 26 per cent of the cases of adult tuberculosis now registered with the Minneapolis Health Department have been discovered through following up contacts of infected school children. Furthermore, the school surveys indicate which children are infected and which children will, therefore, need further supervision in order to detect as early as possible the tuberculosis which will develop in 1 or 2 per cent of them. The fifth plan consists of making the family physician so tuberculosis-conscious that he will give every one who consults him medically an examination for tuberculosis including the skin test and the x-ray. In a comparatively short time the entire population would be quietly and effectively examined by this method.

If tuberculosis could be looked for in this manner, the aim of the National Tuberculosis Association, namely, the discovery of the early case, as well as the earlier discovery of the advanced case, will be accomplished.

So far we have talked merely about the reduction, through hospitalization, of the opportunities for infection. Another very important side of

hospitalization is that of the treatment of the individual patient. To those of us who have had tuberculosis or who deal with people with tuberculosis, this is very important for reasons which are apparent to all. It is essential that those who are conducting this treatment be familiar with its newer aspects, that they have a keen appreciation of the value of rest, both general and local, because the majority of consumptives who have died have at some time or other in their lives been suitable cases for collapse therapy. Manifestly it should be the duty of every phthisiotherapist not to let that period pass without grasping the opportunity. By means of this type of treatment many lives are saved and lesions which have been infectious are rendered harmless. How well this plan works is illustrated by conditions in Chicago, where approximately six hundred individuals who cannot be hospitalized because of lack of room are receiving collapse therapy and approximately one-quarter of them have been rendered non-infectious. Thus in addition to restoring the individual to health this type of treatment has rendered some harmless.

When Koch announced the discovery of the tubercle bacillus, the scientific world, encouraged by the success of the vaccine against smallpox,

chicken cholera, anthrax and hydrophobia, began an enthusiastic search for a specific for tuberculosis either through the use of drugs or some type of vaccine or serum. The longed-for specific has not yet been found but the search still goes on and in time tuberculosis should yield its complete secret.

Koch, however, in his search for a specific, discovered that experimentally a mild infection increased the laboratory animal's resistance towards subsequent infection. This fact has been confirmed by every worker in experimental tuberculosis since then. At first, it was known as Koch's phenomena, but, since the time of von Pirquet, it has been called allergy.

The cry of the world for a specific, forced Koch to announce, against his better judgment, that in tuberculin he has found the sought-for cure. Experience has not borne out his claim, and, today, tuberculin is used chiefly to indicate those individuals who are infected and who are therefore in need of further study. A repeated negative reaction probably indicates that the individual is not infected with the tubercle bacilli or if he is then certain conditions are interfering with the reaction. Thus tuberculin has a very definite place in our diagnostic armamentarium.

Because of this, one of the first activities of the Medical Research Committee, which had been appointed by the National Tuberculosis Association in 1920 to coördinate research in tuberculosis, was to investigate the method of manufacture and use of Old Tuberculin. Investigations soon revealed that there was no uniformity in the manufacture of Old Tuberculin. It was obvious, however, that there must be a single substance which was responsible for the skin test. This substance was finally isolated by Seibert and Long. Upon comparison with Old Tuberculin, it was found to be a more potent testing substance. After nearly seven years of work an agreement has finally been reached between the manufacturers, the Bureau of Animal Industry, the U. S. Public Health Service and also tentatively with the National Research Council of Great Britain concerning the advantages of a uniform testing substance which can be diluted quantitatively for use in tuberculin skin tests. It is hoped that, in a very short time, final steps will be taken in providing such a standard substance for general use.¹⁴ It is hoped that Old Tuberculin in its various strengths will gradually

be discontinued although there is no suggestion that any physician who wishes to continue the use of Old Tuberculin should not do so. Probably only when a standard substance is used by all physicians will epidemiological studies be comparable for statistical purposes.

Another very valuable diagnostic aid is the x-ray discovered by Roentgen in 1895. Because of its ability to pick out areas of tuberculous pathology before they can be detected by physical examination, the x-ray has become a very important instrument in the early discovery of tuberculosis. When this was investigated by the Medical Research Committee, a wide difference in the manufacture and use of x-ray equipment was discovered. This difference includes variations in the component parts of the x-ray machine itself, in the type of electric current used and the type of film on which the shadows are portrayed. After five years of study in this field, the work had progressed far enough for Mr. Warren of the Moore School of Electrical Engineering in Philadelphia to make a survey of the equipment and technic used in various sanatoria last summer. In this study twenty-five institutions were visited, and Mr. Warren offered valuable suggestions as to how their present equipment could be improved in the light of researches which had been carried on. When finally correlated, the results of this survey should be of great value in establishing a uniform standard of x-ray manufacture and technic of operation.

Plans for the Future

The marked decline in the death rate for the past two hundred years suggests that we are within striking distance of the eradication of tuberculosis, provided we learn the lessons which these years should have taught us, and apply them intelligently. The first lesson is that tuberculosis decreases as man's working and living conditions improve. Therefore, we should continue to improve his economic status and thus increase his resistance towards tuberculosis as well as reduce his opportunities of infection. The second lesson is the value of ample sanatorium facilities. It follows that the earlier the tuberculous individual is hospitalized or modern treatment begun in the home, the better are his chances for recovery and the greater is the protection afforded the community. Therefore early diagnosis is imperative.

The experience of the last twenty-nine years indicates very clearly that early diagnosis is not made by passively waiting for the individual to consult a physician. It can be made only by going out after the cases. How are we to do this? There are two general methods: (1) to make the public tuberculosis-conscious by surveys of industrial groups, the family group, the school child and the contacts of those who have died from tuberculosis. The second method is that of educating the physician rather than the public. He is the natural guardian of public health and as such occupies a key position in any health program. If we can so educate him that he will apply the tuberculin test to every one who consults him and then x-ray the positive reactors,* the results will be astonishing. The results of this plan would be even more effective if we could persuade the general public to have an annual medical examination. Such a plan brings each individual physician into the picture in a much more intimate way than the group survey plan could.

Until the long sought for specific is found, the crux of the tuberculosis program for the future is an intensive search for the open case with prompt hospitalization and effective treatment, thus removing the focus of infection and so protecting the public. Medical research should

*Since preparing this paper I have been impressed with the number of adults who have symptoms of tuberculosis with positive x-ray and acid-fast bacilli in their sputum, who are negative to the intradermal tuberculin test in the usual dose. Therefore, I believe that as far as adults and teen age individuals are concerned, it is far safer to x-ray every one with symptoms, even though the tuberculin test is negative, rather than to wait for manifest disease to develop before further studies are made. This may cost the individual a little more than the other plan of x-raying only the positive reactors, but it will avoid many heartaches and tragedies.

continue for two purposes: (1) the improvement of our present methods of diagnosis and treatment; and (2) the continuous study of tuberculosis until its complete secret is discovered.

Only through the combination of clinical and scientific research can we hope to control tuberculosis.

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THE SURGICAL TREATMENT OF PULMONARY TUBERCULOSIS*

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THE past few years have witnessed a decided change in our treatment of pulmonary tuberculosis, because of a better understanding and wider acceptance of special surgical methods of treatment gradually developed during the past few decades. This intrusion by the surgeon into

the tuberculosis field, formerly a strictly medical domain in which any surgical intervention was frowned upon, has meant the rehabilitation of a large number of patients with advanced tuberculosis, otherwise doomed to a chronic invalidism, and has been the means of converting many an otherwise hopeless consumptive into a hopeful, fighting tuberculous individual.

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Lest anyone foster the notion that there is great conflict between the medical and surgical treatment of pulmonary tuberculosis and thereby waste valuable time attempting to find out which is the more valuable, let me state here specifically that there should be no such conflict between the phthysiologist and the surgeon in the treatment of this disease. Each method has its place and very frequently it is only by a combination of the two that the desired end-results can be obtained. Neither medicines nor surgical operations cure pulmonary tuberculosis unaided. The medical regime of prolonged intensive rest, hygienic living, good food, actino-therapy, symptomatic control, etc., properly applied, favors healing by assisting the patient to build up his bodily resistance against the tuberculous disease and by reducing to a minimum any trauma which might help spread the process. Surgical procedures are mechanical methods designed to correct mechanical difficulties which are interfering with or handicapping the patient in his attempt to control the disease. A combination of the two types of treatment is the ideal procedure and will rehabilitate far more individuals, particularly in the advanced group, than will either method alone.

Probably no disease offers a more fruitful field for coöperative medical effort than does advanced tuberculosis with its complications. Co-ordinated work between the internist, phthysiologist, roentgenologist, laboratory worker and the surgeon is not only desirable, but should be almost mandatory. The internist frequently knows tuberculosis from a distance only. The phthysiologist is often at sea as far as the technical side of surgery is concerned. The roentgenologist deals with shadow pictures rather than living beings, while the surgeon all too frequently fails to appreciate the reaction of the tuberculous individual to operations and traumatizes his patient too much, with disastrous results. No surgeon who has not lived with tuberculosis or dealt with it intensively can ever quite appreciate the problem or, without proper guidance from a group, ever reach maximum efficiency in this field. If any one of the group must dominate the picture, let it be the phthysiologist with modern training and thorough knowledge of the patient and his reactions, rather than the ambitious surgeon who wishes "to give everyone his chance" or the timid internist who hesitates to

take any chances or accept the responsibility for suggesting anything radical. Surgical treatment for pulmonary tuberculosis should, as a rule, be preceded by medical management of the disease, utilizing operation as a supplementary procedure to correct some mechanical difficulty and following it with a continuation of the medical regime until the desired result is obtained.

Intensive sanatorium treatment for pulmonary tuberculosis favors the healing of the disease in two ways: (1) by building up the patient's general bodily resistance by hygienic methods; and (2) by reducing through bed rest with suitable posture, etc., the physiological activity of the diseased organ. If, within a reasonable length of time, it becomes evident that the patient is obtaining the desired results under this regime and no complications intervene, then nothing further is necessary except perseverance in this program until an arrest is obtained and confirmed. There are no real shortcuts. The healing of a tuberculous focus is a slow process in which the time element is an extremely important factor. If, on the other hand, it becomes apparent at any time that the patient is unable to handle his tuberculosis under the above regime either because of its extent or, as more usually happens, because of the occurrence of the complications of pulmonary cavitation or hemorrhage, some mechanical help becomes necessary if the individual is to be saved.

The surgical methods employed in the treatment of this disease are mechanical procedures directed either against the lung itself or the respiratory mechanism which activates the lung. The effect upon the tuberculous process and its complications is brought about in two ways: (1) by a relative reduction in physiological function of the lung to afford rest to the diseased area; and (2) by a mechanical reduction in lung volume or compression to close cavities and control bleeding vessels. The secondary effects of alteration in intrapulmonary blood supply and lymphatic flow and their influence on intrapulmonary fibrosis, though important in the healing of a tuberculous process, cannot be considered in this brief review. The surgical procedures directed at the lung itself include: artificial pneumothorax, intrapleural and extrapleural pneumolysis. Those directed against the respiratory mechanism activating the lung include operations upon the phrenic nerve, scalene

muscles, intercostal nerves and the ribs. Each will be considered separately.

Artificial Pneumothorax

Artificial pneumothorax, in which the lung is collapsed to a variable degree and its activity reduced by the repeated injection of air into the free pleural cavity, is our simplest, most flexible, most controllable and, withal, our most valuable type of collapse therapy. It is essentially a bedside procedure, traumatizes the patient but little and may be undertaken no matter how ill the patient may be if suitable indications are present. Reduced to its simplest terms it means the insertion of a needle through the chest wall into the pleural space under local anesthesia and the repeated injection of air in amounts sufficient to collapse the lung gradually to the position necessary to control symptoms and collapse cavities. Profuse pulmonary hemorrhage may demand rapid collapse. This optimum collapse is then maintained by a proper regulation of time interval and size of refill. In this manner symptoms, both toxic and local, may be rapidly controlled with marked benefit to the patient. The treatment should then be continued until sufficient time has elapsed to permit healing of the tuberculous focus, a period of a few years in the earlier lesions, extending to life in the more advanced destructive types of process.

The successful establishment of a pneumothorax depends upon the absence of firm limiting adhesions between the visceral and parietal layers of pleura in the region of the lung lesions. It is the method *par excellence* for the treatment of patients with acute disease, those who are extremely ill or in poor physical condition, as well as for those with profuse or repeated pulmonary hemorrhage. Because the collapse obtained is within the control of the operator, it is also the method of choice in the treatment of the patient who has active disease in the contralateral lung. It is possible with this method to obtain as much as 90 per cent collapse of the lung, far more than with any other type.

The chief disadvantages of pneumothorax are: the necessity for a continuation of the treatment over a considerable period of time; the financial outlay involved; the appearance of a clear pleural effusion of greater or less extent, in more than half of the patients taking the treatment; and the occurrence of tuberculous empyema, a more intensive process of the same etiology, which oc-

curs in approximately 10 per cent of patients in whom the pneumothorax is started for extensive exudative lesions. The advantages outweigh the disadvantages to such a degree that we rely upon it as our first resort where collapse therapy is indicated and at the present time have 34.6 per cent of the 578 patients with pulmonary disease in the sanatorium under this type of treatment.

The results, which are difficult to evaluate in figures, vary from the miraculous to the disappointing, depending upon the extent and position of the collapse obtained. From figures obtained by comparing the results in a group of patients started on pneumothorax with a similar group of patients presenting similar indications where pneumothorax was not attempted or was unsuccessful, pneumothorax may be estimated as offering the patient two or three times the chances of recovery that he has without such collapse. It is to be remembered that the treatment itself does not cure the disease, though it aids materially. Its use in combination with constitutional treatment, bed rest, etc., is essential if the best possible results are to be obtained, particularly if the patient was originally afflicted with extensive disease or really in serious need of collapse therapy.

Bilateral Pneumothorax

A certain limited number of patients suffering from bilateral tuberculosis, especially those who during the course of unilateral pneumothorax have developed an extension of the process into the contralateral lung, may be successfully treated by bilateral partial compression. Bilateral pulmonary tuberculosis *per se* does not indicate bilateral collapse, although occasionally it has been so undertaken. The best results have been obtained in the group in which, at some time after the institution of the original pneumothorax, partial collapse of the contralateral lung has become necessary because of increasing disease or cavitation. Technically, the procedure requires a much more careful regulation than does unilateral pneumothorax because of the patient's diminished respiratory reserve and the necessity for maintaining a proper balance between the two sides, especially in the presence of a flexible mediastinum. Institutional treatment with careful frequent fluoroscopic control is essential, particularly in the early stages and until the treatment becomes stabilized. At times this balance is so extremely delicate and difficult to maintain that it limits the use of this type of

treatment to the hands of those with considerable experience in artificial pneumothorax work. Approximately 8 per cent of our pneumothorax patients at Glen Lake are at present on bilateral simultaneous collapse. The results to date, in a series of over eighty so treated, while not as good as those obtained with unilateral pneumothorax alone because of the extent of the tuberculosis with which we have to contend, still prove it to be of definite value and well worth the effort. Over 50 per cent of the patients so treated are still alive, some for periods of eight or nine years following the institution of the treatment, and a number have been returned to work.

Intrapleural Pneumolysis

Effective pneumothorax may be prevented by three types of adhesive conditions within the chest: (1) extensive short, dense pleural adhesions which prevent effective pneumothorax, the air introduced, if free pleural space is found at all, being limited to isolated pockets; (2) broad and thick adhesions, often containing lung tissue, which hold out cavities or other diseased areas of the lung even when the remainder of the lung is effectively collapsed; and (3) localized single or multiple strings or bands of small diameter, or thin sheets usually of some length, which prevent effective collapse.

This first group with extensive short adhesions presents no surgical possibilities.

The second group offers little chance for surgical intervention unless the peripheral attachment is so localized that the parietal pleura about it may be excised as a button and dropped free into the pleural cavity, a procedure which is rarely possible. Section of such adhesions containing lung tissue almost invariably results in empyema due to the Koch bacillus and secondary organisms introduced by cutting through infected tissue. A few of this group have been handled successfully by wide open thoracotomy with manual compression of the cavity and the adjacent lung without section of the adhesion. The field for this procedure is extremely small.

The third group affords greater possibilities for surgical interference. Before operation is undertaken, however, a reasonable attempt should be made, by gradually increasing the artificial pneumothorax under adequate control, to stretch out these adhesions and see if adequate collapse cannot be obtained. A large number of adhesions of this type may be gradually extended

without rupture and satisfactory collapse and control of symptoms obtained, if sufficient patience is exercised. If after a period of time the cavity or symptom-producing area is not controlled by gentle increase in the pneumothorax in an attempt to stretch these adhesions, then surgery may be used to distinct advantage. These adhesions should be sectioned close to the chest wall to avoid cutting through lung tissue. Thorough coagulation is necessary to provide adequate hemostasis and prevent postoperative intrapleural hemorrhage. Section of adhesive bands may be accomplished in one of two ways: (1) by the open method of thoracotomy, using a wide intercostal incision with ligation and cauterization of the adhesions under direct vision and control, or through a minor thoracotomy incision, the O'Brien type of procedure, in which, through a small opening, the adhesion is picked up, coagulated and sectioned under direct vision; or (2) by the closed method of intrapleural pneumolysis in which a thoracoscope is introduced into the pneumothorax cavity and the adhesions visualized. Then through a separate cannula inserted under local anesthesia, the galvano cautery blade or, better still, the endotherm tip is brought into contact with the adhesion at the desired point, where it is coagulated and then sectioned. The closed method is unquestionably the safer of the two, though technically somewhat more difficult and involving such a financial outlay for proper equipment as only large institutions with a considerable volume of material can afford. The field for intrapleural pneumolysis is relatively small, probably not over 10 per cent of artificial pneumothorax patients.

Extrapleural Pneumolysis

Extrapleural pneumolysis, *i.e.*, the stripping of the parietal pleura from the inside of the chest wall along the plane of the endo-thoracic fascia and the placing of a pack of some material into the pocket thus formed, may be used to advantage in a very limited group of tuberculous patients presenting localized cavities, usually apical, a firmly obliterated pleural space and the lower portion of the lung relatively free of disease. The pleural cavity must be firmly obliterated or the pack tends to shift and allows the cavity to expand at a later date. The cavity must not be of a peripheral type with a very thin lateral wall, or necrosis of the lateral wall may occur, allowing the pack to enter the cavity itself and serious

infection to develop in the extrapleural pocket. Packing materials of various types have been used, including paraffin, wax, gauze, rubber, bone, muscle, fat and mammary tissue, but as yet the ideal packing material has not been found. Fat and other free transplants tend to break down and become easily infected. Muscle and some of the other tissues tend to atrophy and allow the cavities to reopen. Paraffin and other foreign filling material provoke a large amount of exudate, which predisposes to infection, and have a tendency to migrate if the pleural cavity is not very densely obliterated, permitting subsequent reopening of the cavity. If perforation into the cavity occurs, the paraffin may be aspirated into other lung areas with subsequent abscess formation. The field for extrapleural pneumolysis at the present time is small but the procedure does offer certain possibilities of usefulness not altogether met by other methods.

Collapse Procedures Directed Against Respiratory Mechanism

Diaphragmatic Paralysis.—Diaphragmatic paralysis is induced in the treatment of pulmonary tuberculosis in order to obtain some reduction in lung volume on the diseased side and some restriction of physiological activity in the lung. It is brought about by an interruption of the phrenic nerve on the corresponding side in either a temporary or permanent manner, depending upon the design of the operator. Temporary paralysis of the diaphragm (phrenicpraxis) is induced usually by pinching of the nerve and all accessory branches and, less frequently, by alcohol injection or section and resuture. It persists, as a rule, for approximately five and one-half months, but severe crushing may induce a longer paralysis or, occasionally, a permanent one. Permanent interruption of the phrenic nerve is produced either by excision of a centimeter or more of the main trunk of the phrenic and all accessory branches (phrenicectomy), or, more usually, by an avulsion of the distal segment of the trunk from the site of exposure (phrenic exeresis). A reduction of lung volume, 30 per cent or less, occurs, with a relative reduction in physiological activity. We have occasionally used an intermediate procedure and have sectioned the nerve and turned back the proximal end, thus preventing regeneration but still leaving at least the theoretical possibility of resuture and a return to function at a later date if desirable. In these in-

stances, as well as in all temporary interruptions, we have followed Alexander's technic and left a black silk thread about the nerve to facilitate finding it subsequently. We much prefer doing a temporary interruption and repeating it two or three times if necessary, to performing the radical exeresis, particularly in the case of a patient with limited upper lobe disease. Even though radical operation on the upper lobe is later necessary, a functioning lower lung affords greater respiratory reserve and working capacity than would be present with the diaphragm paralyzed. The paralyzed diaphragm rises into the chest to a variable degree depending upon the relation between intrapleural and intra-abdominal pressure and the presence or absence of limiting lateral adhesions. Active motion ceases, to be replaced by a paradoxical motion which at times may even approach the extent of the normal excursion. While the average postoperative rise of the diaphragm is between two and four centimeters, we occasionally encounter an excessive elevation, even to the level of the second rib on the left side and the third on the right.

Phrenic nerve surgery has become our second resort procedure in the collapse therapy field. It is utilized in those patients who are unable to take artificial pneumothorax because of obliteration of the pleural space and who are either not in condition for the more radical extrapleural thoracoplasty or do not, at the moment, present the proper indications for it. Thus we use it in extensive lesions requiring collapse of some sort, in an attempt to control profuse or repeated pulmonary hemorrhage, or a preparatory preliminary to thoracoplasty to help the patient until he is in suitable condition for the more radical procedure. A small group of pneumothorax patients presenting adhesions between the lung and apical pleura and the lung and the diaphragm, but without firm lateral fixation, may be definitely helped by diaphragmatic paralysis, the release of longitudinal tension permitting better collapse above. It has been suggested as a preliminary operation to test the competency of the contralateral lung prior to thoracoplasty and also as a prophylactic to prevent aspiration of material into the base during and following an upper thoracoplasty, but in both it has failed to meet expectations.

Probably three-quarters of the patients will show some symptomatic improvement such as reduction in cough and expectoration, diminution

in toxic reaction, increased facility in raising the sputum, cessation of pulmonary hemorrhage, etc., following this diaphragmatic paralysis. A smaller number present increased difficulty in expectoration; others gastro-intestinal distress with flatulence and upper abdominal discomfort, more frequent following left-sided operations; and some, for a time at least, some difficulty in defecation caused by loss of intra-abdominal pressure on effort, due to the rise of the diaphragm. Occasionally we see almost miraculous results, with marked clearing of the tuberculosis and disappearance of large annular shadows in a relatively short period of time. However, not a few of these later relapse and subsequently require intervention of another type. Operation on the phrenic nerve is valuable in its place, but too much has been expected from it. It is probably the most abused of our collapse procedures at the present time.

Section of the Scalene Muscles.—Section of the scalenus muscles, the anterior, medius, and posterior, close to their insertion into the first and second ribs, has been suggested as an accessory procedure in the treatment of pulmonary tuberculosis in order to induce additional immobilization of the corresponding side of the chest. It may be accomplished quite readily through an extended phrenic incision. It should be remembered that scalene muscles are accessory muscles of respiration which on quiet breathing are brought into play little, if any, except as an upper support to the first and second ribs and through them to those below. While the bony chest wall remains intact, little can be expected from such a procedure in the way of collapse and the immobilization obtained can be readily duplicated by the proper application of weights or mechanical devices to the chest wall without operative interference.

Intercostal Neurectomy.—Section of the intercostal nerves posteriorly has been suggested as a means of obtaining immobilization of the corresponding hemithorax by paralysis of its activating muscles. As with the aforementioned procedure, I question whether the results obtained are sufficiently better than those readily obtainable by the judicious use of weights or mechanical compression to justify the sacrifice of function of the numerous muscles which this procedure entails.

Extrapleural Thoracoplasty. — Extrapleural thoracoplasty is a major surgical procedure

which brings about both a compression and immobilization of the diseased lung by the wide excision of its rigid supporting rib structure. Its use is reserved to two classes of patients: those with extensive unilateral tuberculosis, chronic in type and massive in extent, usually with the complications of cavitation or hemorrhage, who have not recovered under conservative treatment and are unable to take pneumothorax because of an obliteration of pleural cavity; and a smaller group with tuberculous empyema where obliteration of the pleural pocket is necessary or desirable. It is a radical procedure for use where drastic methods alone will produce results. Collapse of the lung is obtained by a wide resection of ribs over the involved area, the extent of which is determined by the underlying pathological process, varying from a limited resection of the upper few ribs posteriorly, to a complete deribbling of the entire chest wall. Collapse of the lung and closure of cavities is obtained by this wide subperiosteal rib resection, while immobilization and reduction of physiological function of the lung is maintained permanently by fixation of the chest wall in the collapsed position by subsequent rib regeneration along the periosteal sheath. When once done, this process is irrevocable, hence the necessity for a stable or inactive lesion in the contralateral lung if any involvement whatsoever be present.

A proper choice of the patients for this type of operation is essential. Almost equally important is the choice of the proper time at which to operate on a given individual who presents all of the classical indications for the procedure, for unless the most favorable time is chosen in each particular individual, the risk may be very materially increased. The surgical procedure itself must be gauged to meet the individual patient's requirements rather than to fit any preconceived plan. Due care must be exercised not to traumatize the patient too much lest the tuberculosis become activated and either terminate the picture or produce a prolonged disability.

In practice, the more radical operations frequently prove the more conservative. The limited Wilms-Sauerbruch type of posterior thoracoplasty has very frequently given inadequate collapse, particularly when dealing with extensive lesions, large cavities or empyema pockets. The more radical Brauer subscapular type has proved more satisfactory, but even this not infrequently must be supplemented by antero-lateral

resection of the remaining segments of the upper ribs and cartilages in order to obtain closure of large apical cavities. Multiple stage operations here, as in other types of extensive operative procedures, have supplanted single stage procedures to a large extent, sacrificing some flexibility of the chest wall for the patient's safety. Care and gentleness in the handling of tissue has replaced the former mania for speed with its attendant excessive trauma, with consequent diminution of shock and better postoperative convalescence among the patients. In a similar manner, local anesthesia has been replacing the inhalation type to a considerable degree, particularly among the bad risk patients.

The operative risk for thoracoplasty procedures has been very materially reduced by careful coördinated effort between the various members of the group, and by attention to the points just mentioned, from an original widely quoted 10 per cent or higher to a figure which compares favorably to that obtained in other surgical fields. At present we have a series of 189 consecutive thoracoplasty operations on 83 patients without a single operative death, and but one late death at six and one-half months with a contralateral extension of the tuberculosis and a tuberculous meningitis. During this same period the field for thoracoplasty has been materially increased and many patients included who in the earlier days would have been considered unsuitable for surgical interference. Continued constitutional treatment for a considerable period following surgical interference is essential. Failure to do this may undo all that the operation has accomplished.

The field for thoracoplasty is yet small, probably 5 per cent of the patients admitted being suitable for such intervention, yet in the aggregate, the number of individuals thus affected becomes quite great. The results are most encouraging and are becoming more so. From a series of 205 thoracoplasty patients operated upon at Glen Lake Sanatorium from 1922 to date, 160 (78 per cent) are still alive, a considerably higher percentage than one should expect with the same patients without surgical interference. Our object should be not alone to save life, but to rehabilitate the individual if possible. Seventy-seven per cent of the discharged group have not only acquired control of their tuberculosis, but have been returned to work. These figures do

not include the patients operated upon within the past twelve months, a period too short to permit such rehabilitation. Some of these individuals have gone as long as ten or eleven years since their operation and are still in good condition. Sixteen of these patients have been subjected to twenty-two major surgical procedures subsequent to their thoracoplasty for serious extrapulmonary pathological conditions, and all save one, a boy with a ruptured appendix and general peritonitis following a pneumonia, have come through with flying colors. Four have gone through pregnancy, one for the second time, without serious complications, a truly remarkable record when you consider the original condition of these patients and their general hopeless future without the surgical intervention.

Conclusions

Collapse therapy measures as a supplement to constitutional treatment for pulmonary tuberculosis have proved themselves of very definite value in aiding the individual who is unable to handle his tuberculosis alone. While most of them are specialized procedures of greater interest to those engaged in tuberculosis work, these measures should so challenge the interest of the whole medical profession that tuberculous individuals presenting suitable indications for their use may be offered the advantages of surgical treatment before the most favorable time for their use has passed.

Discussion

S. W. HARRINGTON (Rochester): It is a pleasure for me to discuss Doctor Kinsella's paper on the Surgical Treatment of Pulmonary Tuberculosis, because I am personally acquainted with the splendid work he is doing and because his views are very similar to mine in regard to the surgical treatment of these lesions. I wish to compliment him on the comprehensive and splendid presentation he has made of the subject.

I shall not go into detail concerning the various surgical procedures utilized in the treatment of pulmonary tuberculosis because Doctor Kinsella has covered this field very thoroughly. I shall confine my remarks to some of the fundamental principles underlying the surgical treatment of these lesions and I thoroughly agree with Doctor Kinsella that surgical intervention should be conservative and judicious. I should like to stress the fact that there is a definite place for surgical treatment in cases of pulmonary tuberculosis. This is evidenced by the constantly increasing number of patients who have been treated by various surgical procedures and I think there is no doubt but that surgery is one of the most important factors in the decrease of

the death rate and morbidity of this disease in the past two decades.

The chief problems concerned in the treatment of pulmonary tuberculosis are, first, to make the diagnosis early and, second, to institute immediate, adequate treatment. The basic treatment of the disease is rest, rigidly supervised and carried out in a sanatorium under a well regulated medical regimen, and in many cases in which the diagnosis has been made early, arrest of the disease can be affected by this conservative type of treatment. Unfortunately a large percentage of patients do not present themselves for examination early in the course of the disease and the diagnosis is not established until the lesions are fairly well advanced. In these more advanced cases, rest in bed often does not sufficiently quiet the lung to permit healing to take place. It is in this group that surgical intervention is indicated to give enforced rest to the diseased lungs by immobilization and collapse of the diseased tissues. It is impossible definitely to estimate the length of time that conservative measures should be carried out for this depends on the healing response in each case.

Surgical treatment should be instituted in cases in which a well regulated regimen in a sanatorium has been followed and in which healing has been slow. In any case in which conservative measures have produced adequate improvement, surgical procedures should not be considered merely to hasten the cure. However, they should not be delayed in cases in which there is no improvement in a reasonable time for often the simpler operative procedures will effect cure in the early cases which, if permitted to progress, would require much more extensive and hazardous operative treatment at a later time.

Selection of cases for surgical treatment demands the closest coöperation between clinician and surgeon. Cases should be selected for surgical treatment only after close study of the clinical progress of the disease. The type of cases most suitable for surgical treatment is that in which the process is proliferative or fibrous rather than exudative, for in the former two types encapsulation is taking place by the formation of fibrous connective tissue and this process will be greatly aided by surgical intervention. The present surgical measures are indirect types of treatment in which the diseased tissue is not removed. The chief object of all surgical procedures is to produce pulmonary collapse and to put the lung at rest. The collapse should be sufficient to promote drainage of existing abscess cavities and enough compression should be induced to produce approximation of their walls. This permits healing and the resulting fibrosis necessary to obliterate the lesions. There are many explanations for the general beneficial effects on the patient and the process of healing of the tuberculous lesions following collapse therapy; some of these explanations involve the question of immunity as well as that of mechanical compression of the pulmonary tissue. The latter produces lymphatic stasis and hyperemia in the quiet parenchyma of the lung. These factors are conducive to the growth of fibrous connective tissue which encapsulates the diseased portions.

The type of operation to be instituted depends on the findings present in each case. It was formerly thought that operation was advisable only in cases in which involvement was unilateral, but in recent years excellent results have been obtained in cases in which there was also a moderate amount of disease in the opposite lung. In many cases it is advisable to institute surgical measures which are temporary in effect and then to observe the results obtained. The subsequent course may indicate the advisability of reestablishment of function of the lung or the institution of another form of treatment.

The clinical course of the disease can be closely followed by physical examination and by inquiry as to the subjective symptoms but knowledge of the condition is greatly aided by repeated roentgenologic examination of the lung. In those cases in which operation is instituted, roentgenologic examinations of the lung are of utmost importance, and may be deemed an absolute necessity, for it is only by this means that one can definitely determine the amount of pulmonary collapse which has been obtained, whether or not there are any obstacles to certain types of treatment, and what progress the lesion has made.

Artificial pneumothorax is the most common form of collapse therapy which is utilized and I like to look on it as the first line of surgical attack. Everybody who has treated many patients by means of artificial pneumothorax experiences the same pleasure and disappointment in the results obtained, for it is never possible to predict the result nor whether the collapse will be sufficient to control the symptoms. If it is not sufficient to control the symptoms, then other types of compression are to be considered. I believe one of the greatest questions in connection with artificial pneumothorax is when to discontinue the use of artificial pneumothorax on patients whose symptoms have been controlled by this procedure. We see many papers dealing with the indications for this type of treatment and the number of patients treated by it, but there are relatively few papers in the literature which deal with the indications for discontinuance of the treatment. This is undoubtedly explained by the facts that this method of treatment came into use so comparatively recently and that a sufficiently large number of cases has not been followed to allow any definite conclusions to be drawn. In my own cases, I have not felt justified in permitting the lung to expand in less than three years, and only then in cases of moderate severity. In the more severe cases which have been controlled by artificial pneumothorax, I have felt safer to keep the lung compressed for five years.

I agree with Doctor Kinsella that operations for interruption of the phrenic nerve are probably the most abused of all compression procedures at the present time. There is no doubt but that interruption of the phrenic nerve has a great field of application in treatment of tuberculous lesions, both as an operation complementary to other procedures and as an initial and sole operative procedure. It is probable that the marked beneficial effects that have been obtained in many cases have led us to expect too good an ultimate result in

the presence of more extensive involvement. These cases should be closely followed, for a false sense of security may be induced by the amount of improvement that follows interruption of the phrenic nerve. In some of these cases, later, the disease may extend or involvement of the contralateral lung may take place, which will make further surgical treatment by thoracoplasty extremely hazardous or impossible. In such cases the disease might not have progressed had the more complete collapse by thoracoplasty been done following the preliminary procedure.

Surgical collapse by rib resection is the basic treatment for the more extensive lesions, the situation and extent of the collapse depending on the location of the

lesion and the condition of the patient. Because of the operative risk in these cases, and because of the importance of avoiding long, tedious, traumatizing operative procedures, these operations are best done in stages, never less than two, and as many more as are necessary to complete the operation safely for the patient.

I shall not go into discussion of any other surgical procedures to produce collapse. In closing I would like to stress one fundamental consideration of all surgical treatment of pulmonary tuberculosis: that is, the careful selection of the operative procedure that will bring about rest of the tuberculous lesion which is present, and this can be accomplished only by the closest cooperation between the clinician and the surgeon.

ECZEMA IN INFANCY AND CHILDHOOD*

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ECZEMA is a common disorder of the skin and, although it is composed of a number of dissimilar conditions that often are mixed or overlap, we are probably justified in our present lack of specific knowledge in grouping these clinical symptom-complexes as eczema.

Skin diseases in infancy and childhood differ from the adult for the following reasons:

1. The skin of infants is more delicate, has a higher water content, is less resistant to irritation, and more susceptible to infection.
2. The constitution of the child plays a greater rôle than in the adult and consequently there is a greater need of dietetic and environmental treatment.
3. Allergy plays a more important rôle in childhood, due to the greater permeability of the mucous membranes of the gastrointestinal tract to certain proteins.
4. Manifestations of mycotic and fungus infections are less evident.
5. Occupational eczema need not be considered.

My reason for discussing eczema in infancy, as such, is because it is one of the most common conditions a children's specialist has to treat. At no time in life is a clearer understanding of the underlying causes of this condition needed more than it is in infancy. Upon this, depends the

successful management and treatment of the case. The "hit and miss" practice of applying ointment after ointment as, unfortunately, is so often seen, only leads to disappointment and failure; it increases the suffering of the infant, prolongs the disease and enhances the burden on the already apprehensive mother.

The pediatrician considers eczema not merely as a skin disease (as does a dermatologist), but as one of the manifestations of an exudative diathesis. By exudative diathesis we mean a constitutional condition characterized by a tendency to exudation in the skin and mucous membrane. In infants, in contrast to older children, it manifests itself by disturbances more in the skin and less in the mucous membrane.

In Infancy

IN THE SKIN	MUCOUS MEMBRANES
1. Seborrhea Capitis	1. Frequent digestive disturbances
2. Intertrigo	2. Frequent colds
3. Eczema	3. Frequent vaginitis and cystitis
4. Eczema Intertrigum	4. Tonsils and adenoids
5. Strophulus	5. Lingua geographica

These infants are constitutionally below par, and will not thrive in spite of a sufficient amount of breast milk. They respond peculiarly to infections and other disturbances and often have repeated digestive disturbances with frequent green stools.

At about one and one-half years of age a lull

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period occurs, when the skin symptoms usually disappear and we often feel that the infant has been cured, but are disappointed when in early childhood we find that the manifestations of this condition again begin to show themselves. Now they are more pronounced on the part of the mucous membranes and less on the skin. This is just opposite to what occurs in infancy.

Older Children

IN THE SKIN

1. Eczema
2. Urticaria

MUCOUS MEMBRANES

1. Frequent colds
2. Frequent tonsilitis
3. Recurrent bronchitis
4. Asthma
5. Vaginitis
6. Colitis

Eczema may be divided into three types: (1) seborrheic; (2) pruriginous; (3) mixed. It is important to recognize these distinct types in order to successfully diagnose and treat them.

Seborrheic eczema usually occurs in the first six months of infancy. It is accompanied by seborrhea of the scalp. The lesions predominate on the flexor surfaces and folds. Rarely is any eruption found on the face, but if present there it is of a dry type, being mostly on the forehead and extending down in front of the ears (merely an extension from the scalp). The lesions are composed of papules with greasy crusts, or confluent greasy crusts on a smooth, red, dry, or moist base. No itching is present. The patients are often in an improper nutritional state. However, the prognosis is good and relapses are rare. The cause is metabolic.

In the treatment of this and other types of eczema we must first consider the prophylactic measures of keeping the child cool and well powdered. No soap should be used and no wool clothing. This may often keep a latent eczema from becoming manifest.

Seborrheic eczema rapidly responds to proper dietetic and local treatment. In this form of eczema the dietetic treatment is much more important than the local treatment. First, the child must receive the proper amount of food quantitatively to cause proper gain in weight. Second, the child must get the proper qualitative diet to correct the underlying metabolic disturbance. This is accomplished by prescribing a diet low in fat and high in protein and salts. If breast fed, two of the feedings should be replaced by buttermilk mixture. If artificially fed, all the feedings should be of buttermilk or some other

feeding low in fat and high in protein and salts.

Locally, one must remove the crusts with oil and apply a simple ointment, like zinc paste. Later 1 to 5 per cent Tuminol may be added. For the scalp, an ointment containing 2 per cent salicylic acid and 5 per cent sulphur works satisfactorily.

Pruriginous eczema, in contrast, to seborrheic eczema which comes in the first half year of life, does not commonly begin until the second half of the first year. It usually occurs in the blonde child who is of the pasty type of constitution. These children are usually overnourished and, even if not, appear so; although the body may be thin the face always seems full. The cause of pruriginous eczema is an allergy to some protein in the infant's diet or more rarely to something in its environment.

The location of the lesions in this type of eczema is usually in the center of the cheeks and on the extensor surfaces of the body. The lesions are composed of papules, which are isolated or confluent into groups or into a mass of infiltration due to closely packed individual papules. There is no crusting unless secondary infection (impetiginous eczema) occurs. In acute cases weeping may be present (weeping eczema). The papules, if scattered, may be hard and nodular, like small sago grains, or hard nodules with a red areola (strophulus), or if in a low grade chronic state are composed of small papules and scratch marks (prurigo). Itching is intense in contrast with the seborrheic form of eczema, which does not itch. The prognosis is not good as the duration is long and relapses occur frequently.

The treatment of pruriginous eczema is difficult and relapses occur frequently with a tendency to future chronic eczema and neurodermatitis.

In general an attempt must be made to find the offending protein, from the history of the case, by skin tests or by selective non-allergic diets. Where these procedures are not feasible, one may resort to the dehydration of the skin and produce good results, especially in the weeping and impetiginous cases. When this is combined with other local and general measures the course will be considerably shortened.

Dehydration is produced by restricting water and salt in the diet and this is accomplished by giving a concentrated diet low in milk which con-

tains 0.76 per cent salt. Desiccated thyroid, which lowers the water content of the tissues, may be used.

Skin tests have been popular since the work of Schloss in 1914 and Blackfan in 1916 but in my experience are disappointing. Theoretically the removal of the food which has been found positive by skin tests should produce a cure, but practically it does not work so well.

However, it is advisable to use these skin tests as a guide, if only one or a very few foods are found positive. If many foods are positive it is best to try other methods of treatment. One must always remember that eczema is only a "beauty fault" and will in time get well by auto-immunization. Therefore it seems wrong to undermine a child's health by drastic restriction of diet unless this seems imperative.

Of the three methods used in skin testing, the scratch, intracutaneous and patch methods, I prefer the first because of its simplicity.

In early infancy I seldom do skin tests but prefer dehydration and proper feeding. Specific foods recommended include devitalized milk such as Nestle's food, or non-allergic milk produced by S. M. A. Co., or artificial milk substitutes which contain no milk, such as Sobee or Cemac. These may help overcome the allergic disturbances.

Locally, crusts must be removed here also, first, because they are irritating; and second, to allow the remedy to come in contact with the skin surface to be treated. In the diffuse mild scattered type of this disturbance a lotion is preferable such as:

R—Tuminol	1
Zinc Oxide.....	20
Talc	20
Glycerine	5
Aqua	100

In severe cases of pruriginous eczema, tar is almost of specific value both locally and constitutionally. At my last visit to the clinic of Professor Leiner, he claimed that when only a part of the lesions are treated by tar you will obtain improvement in the other lesions due to absorption of tar through the raw surface of the treated areas. Also, contrary to old teachings tar may be used both on acute and weeping surfaces. A good formula is:

R—Crude Coal Tar.....	2
Zinc Oxide.....	2
Vaseline	30

In chronic and indurated areas use:

R—Starch	20
Salicylic Acid.....	6
Sulphur	3
Crude Coal Tar.....	12
Lanolin	12
Saponis Viridis and	
Vaseline q. s. ad.....	60

For moist and weeping surfaces the daily application of 5 per cent silver nitrate or cold boric packs are useful in stopping the exudation. Areas where the ointment is rapidly wiped off by the child may be treated successfully by painting each day with full strength crude coal tar. Where itching and chronicity are observed, good results are obtained with x-ray treatment.

During the whole course of treatment of pruriginous eczema we must not forget the itching, since the scratching and itching make up a vicious circle, which keeps up the inflammation. Locally we use restraints such as cuffs, and constitutionally we diminish nerve irritability by bromides and phenobarbital. This itching is a neurosis of a conditional reflex nature and therefore persists long after the cause of itching has been removed, with the result that the temporarily cured eczema may flare up again from the trauma of scratching.

Relapses are common in pruriginous eczema. They are usually caused by irritants such as heat, wool and irritants either mechanical or chemical. Dentition, infection, overeating and gastrointestinal disturbances may also cause relapses.

There are a number of skin conditions in infants often described as distinct clinical entities, but which are merely different manifestations of eczema. They should be classified as eczemas because of certain basic characteristics.

I refer to: (1) erythrodermia desquamativa (Leiner); (2) seborrheic dermatitis; (3) neurodermatitis; (4) impetiginous eczema; (5) strophulus; (6) Ritter's disease (dermatitis exfoliativa neonatorum). Now a few words about each of these before closing.

Erythrodermia desquamativa (Leiner).—This was first described by Leiner in 1908. It is characterized by a diffuse inflammatory redness often covering the whole body, accompanied always by desquamation and usually by seborrheic manifestations. The scales may be so large that whole flakes of the horny layer of the skin are detached as in scarlet fever or they may be fine and branny. The skin is not dry but excessive

exudation is not present and there is no tendency to crust formation. This condition is usually found in previously well developed breast-fed children. Soon severe intestinal disturbances occur with frequent green stools and evidence of toxemia. The prognosis is not good, the mortality being often as high as 30 per cent. This condition is really a form of acute seborrheic eczema and should be treated along these lines. Locally the following should be applied three times a day:

R—Zinc Oxide..... 30
Olive Oil.....100

If a proper dietetic routine is instituted as previously described under seborrheic eczema, that is, a combination of breast milk and butter-milk mixture or some other formula high in protein and salts, there will be a rapid diminution of the dyspeptic stools and a gradual disappearance of the constitutional symptoms.

Seborrheic dermatitis is often mentioned as a separate clinical entity but is also only one of the manifestations of seborrheic eczema. It resembles *Erthrodermia Desquamativa* except that the seborrheic manifestations are greater and the constitutional manifestations less. Greasy scales on the head are much more marked and eruption on the body tends to be more moist. The most important differential diagnostic point is that the eruption does not cover the whole body as in Leiner's disease, but stops at the waistline, leaving the trunk practically free, giving the so-called riding breeches type of distribution. Gastrointestinal symptoms are also less pronounced. The prognosis is not so grave and the treatment of this is similar to that described in Leiner's disease.

Neurodermatitis is a condition found in older children usually from the age of two to five years. It is characterized by a thickening of the skin and a smooth reddish-gray lichen-like rash on the flexor surfaces of the knee and elbows, and also occasionally on the back of the neck. This is usually found in neuropathic children who have had eczema previously and is characterized by marked itching and repeated tendency to relapse. This is merely a type of pruriginous eczema wherein the condition has become a neurosis after the allergic phase has been passed. This disturbance should be treated as a neurosis. Dietetic changes are not necessary and are of no

avail. The child's health should be built up and the patient should be removed from all irritating environmental influences. A vacation to the country will often work as a miracle. Locally, crude coal tar (full strength) or in ointment form, combined with x-ray will remove the itching and infiltration. Large doses of sedatives are of great benefit. At the recommendation of Professor Leiner we have used certain animal fats, as Cod Liver Oil, or vegetable fat, as corn oil, in these cases with apparent benefit.

Impetiginous eczema is a term used to describe an eczema which becomes infected. Here the infection seem to play the prominent rôle, so that the eczematous background is hardly manifest. It is more commonly found in cases of pruriginous eczema than in the seborrheic type, as the former usually tends to be more moist, and occurs in older children who have a greater opportunity for infection, and who, due to their itching, are more liable to cause infection by scratching. It is more important not to forget that scabies or pediculosis capitis may be a predisposing factor and must be properly treated.

In the treatment of impetiginous eczema proper, the crusts may be removed by cold boric acid packs in the daytime and a weak ammoniated mercury ointment at night. Usually at the end of two or three days the infection will have been eliminated and the eczema can be treated by the methods previously described for this type.

In stubborn persistent cases a marked change for the better can be procured by the dehydration diet previously described. Hydrochloric acid may be given, for acid tissues are less moist than alkaline. This causes a diminution of the oozing which has been the culture media for the bacteria.

Strophulus is a disturbance characterized by the appearance of papules either isolated or in groups, on the extensor surfaces and buttocks. At first these papules are surrounded by a red areola which soon disappears leaving behind large sago-like nodules. This is one of the forms of pruriginous eczema. In its treatment we must remember that it is an allergic condition often caused by milk. It is best treated by eliminating cow's milk from the diet, and temporarily putting the child on goat's milk, and when the lesions have disappeared, cautiously adding new

foods. Locally a lotion like calamine lotion is satisfactory.

Ritter's disease (Dermatitis Exfoliativa Neonatorum) is a condition the etiology of which has been repeatedly questioned. Various explanations of the cause of this condition have been made. Our impression is that it is a pemphigus neonatorum superimposed upon the child with a seborrheic form of exudative diathesis. Those cases which we have been able to follow eventually show manifestations of eczema. This disease usually begins similar to pemphigus. Later the lesions become larger and less defined, sometimes involving areas as large as the palm of the hand. Characteristic of this disturbance is a condition of epidermolysis, that is, the cutis is separated from the epidermis by an invisible serous exudate, so that if one rubs an apparently normal area of skin briskly with the tip of the finger the skin will peel off leaving a moist surface. Also typical of this condition is a tendency to marked infiltration around the mouth. Associated with this disease are marked constitutional disturbances, with fever and sometimes even convulsions.

The treatment of this condition is similar to that of pemphigus. Their etiology is similar, since they are primarily infectious. The tops of all lesions are removed carefully in order not to distribute the pus. The raw surfaces are touched with 5 per cent silver nitrate and then the following lotion is applied:

R—Dermatol	10
Zinc Oxide.....	20
Talcum	20
Glycerine	5
Aqua	100

The child should have daily baths of tannic

acid and be continually powdered (dry treatment). No salves are to be used. In addition to the tannic acid baths, the continual powdering and the drying lotions, we have the child lie in a hammock formed by pinning a sheet to the edge of both sides of the bed. The child lies without clothes on a bed of powder and is thus kept dry and continually rolling in powder. The bed clothes are kept from touching the skin by a cradle.

Since Ritter's disease is an infection in an exudative child, breast milk as an exclusive diet is not satisfactory. If the child has two or more of his feedings replaced by a formula high in protein and salts such as the buttermilk mixture, the high mortality, which has often been stated to be 50 per cent, will be much reduced, and the course and severity of the disease favorably modified.

Conclusions

1. Eczema, although a group name, is still a fairly distinct entity and should be retained, unless further specific information invalidates our present concept.

2. In infancy and early childhood one should not consider eczema merely as a skin disease, but as one of the manifestations of a constitutional condition called exudative diathesis that must be treated constitutionally as well as locally.

3. This condition covers two distinct types, etiologically and clinically different, and requiring different treatment. Often these types may be mixed.

4. Various other conditions previously described as separate diseases but which are merely types of exudative diathesis have been briefly considered.

CASE REPORTS

LITHOPEDION*

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A lithopedion or "stone child" is the result of the infiltration of the fetal structures with calcium salts in an ectopic pregnancy that has developed to the fourth, or, as a rule, to or beyond the seventh month.

An ectopic pregnancy usually occurs in the tube. Some authors believe that ovarian or abdominal pregnancies seldom if ever occur primarily and that they are the result of an expulsion of the fetus from the tube and attachment to the ovary or some abdominal tissue such as the broad ligament, from which the necessary blood supply is obtained.

Uterine lithopedions have been reported where the primary growth of the fetus was in the cornua with a gradual enlargement into that portion of the uterus. Küchenmeister⁵ reports three such cases.

T. Cuizza² reports a rupture of one horn of a bicornate uterus and the formation of a lithopedion.

The following classification of lithopedion by Küchenmeister⁵ is generally accepted:

1. Lithokelyphos—only the membrane surrounding the fetus being calcified.
2. Lithokelyphodion—the fetus and membranes being calcified and adherent.
3. Lithopedion—the fetus alone being calcified. Here the membrane may be absent or closely adherent to the fetus.

Calcification is the final stage of an ectopic pregnancy unless decomposition, absorption, expulsion or surgical removal takes place. The fetus shrinks in size after death occurs, the fluid portions being absorbed.

Schumann⁸ states that 3.3 per cent of normal embryos implanted in the tubes go on to full term, 1.05 per cent die, 2.2 per cent become monsters, and the remainder are absorbed. He collected records of fifty cases coming to full term and operated upon. Other authors report that a lithopedion develops in 1.5 to 1.8 per cent of extrauterine pregnancies.

A very small percentage of cases of lithopedion were diagnosed before operation prior to the beginning of the twentieth century. No doubt the percentage of lithopedions in ectopic pregnancy as given would be too high at the present time as a diagnosis of ectopic pregnancy is now usually made early and operation performed before the formation of a lithopedion is possible. A lithopedion will probably be a rarity in the future.

When an ectopic fetus reaches full term and no operation is performed the following may result: (1) Skeletonization with absorption of the soft parts; (2)

replacement of the soft parts with fatty acids, soaps and stearic acids without suppuration; (3) suppuration with abscess formation and destruction of soft structures and discharge of pieces of bone through the vagina, rectum or occasionally the skin; (4) true lithopedion formation with infiltration of calcium salts.

In a case of lithopedion there is usually a history of pregnancy with atypical signs; later a mass may be found in a lateral position in the pelvis. As absorption of the fluids in and about the fetus occurs, the mass becomes smaller but more defined and intimately associated with the uterus and adnexa. Mild abdominal pains often occur with symptoms of pressure on the rectum or bladder. There may be nausea, vomiting, dysuria, or constipation. The general health may be affected, with anemia and loss of weight. Carcinoma may be suspected. From extreme pressure or ulceration the gastro-intestinal tract or bladder may become definitely involved. In some cases few or none of these symptoms are present until near or at full term, when labor pains may begin with no signs of delivery.

When a lithopedion is within the uterine cavity, infection with foul discharge and expulsion of the contents are likely to occur early.

Smith⁹ reports a case of lithopedion being retained fifteen years and causing bowel obstruction.

The x-ray may positively identify the lithopedion because of its density.

Kroemer⁴ in 1900 reported thirty definite cases.

From the last of the sixteenth century to the present time there have been reported about two hundred cases of lithopedion, an average of less than one a year. An unreported case has been called to my attention in a personal communication from T. P. McNamara⁶ of Dubuque, Iowa. This was a tubo-abdominal pregnancy which went to full term. The tube was connected directly with the sac, but final degeneration and low grade infection necessitated an operation.

D'Aunoy and King³ reported eighty-six cases of *true lithopedion* up to 1922 and since that time eight cases have been reported. This case of mine herein reported makes a total of ninety-five cases.

Bacon¹ states that in a series of 7,311 necropsies two lithopedions were found and in another series of 610 necropsies nine were discovered.

Kuchenmeister⁵ tabulated reports by various authors of forty-eight definite cases from the years 1582 to 1880. He states the first case was reported by Albusius. Of these, five were abdominal, seven tubal, nine ovarian, eight uterine, and the balance were not definitely described. The duration of the lithopedion ranged from six months to fifty-seven years, the average being eighteen years. Twenty-one had had previous pregnancies, one woman had had 12 previous children, but most of them had had either one or no children. Eleven had one, four had two children each afterwards, and the rest gave no record of subsequent chil-

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dren. The pains began between the seventh and ninth months in seven cases, and earlier than this in the rest. There was one case of twin lithopedions.

Palliez and Dernez⁷ questions what becomes of the cord and placenta. In my case here reported the cord and placenta were recognized and were calcified.

Case Report

The patient, Mrs. J., aged sixty-two, is a widow living on a small truck farm. Her husband died of cancer two years ago, her father of old age and her mother is still living at the age of ninety.

The patient has had no diseases except measles as a child and influenza in 1931, and no operations. She has had a great deal of headache and backache either before or after her menses, which began at the age of thirteen. The periods were regular, lasting about three days and of normal flow. She was married at the age of twenty. A year later, that is forty-one years ago, she had the characteristic symptoms of a normal pregnancy and at no time during the nine months does she remember having had any acute pains in the abdomen. During this time she had had less headache and vomiting. She came to term at the expected date and had definite labor pains which lasted two days and then stopped altogether. She was told by the physicians in attendance that an operation would be necessary.

Various doctors were called in consultation and it seemed to be their united opinion that the fetus should be removed surgically. A month or two elapsed before the patient finally saw a "specialist" in the city. An operation was advised, but since she felt well and the size of her abdomen was decreasing she decided to ignore the advice of her doctors. Contrary to expectation, the patient began to feel better and the size of her abdomen gradually decreased. She was later advised by her doctor not to have children. She, however, remained in good health, had no complaints, and subsequently bore nine children. Eight are living and well, the oldest being thirty-nine years old and the youngest eighteen.

With all the pregnancies she had less headache and vomiting than at other times. She had no dystocia with the labors. She had a perineal and cervical tear with resulting leukorrhea, which responded to treatments. She had some dysmenorrhea, an occasional headache, some nausea and vomiting until the menopause at the age of fifty-two. Her periods were always regular and about of the normal amount. Since the menopause she has had some vomiting spells and headaches, but not as frequently as before.

The patient states that at various times she has been urged by doctors to have the tumor removed, but not until a prolapsed uterus became very annoying, could she be persuaded to have an operation. The tumor itself gave no symptoms. She has obtained some relief for the prolapse by wearing a disc pessary for the last six months.

Five years ago she began to have a bearing down sensation in the pelvis. She gradually developed a prolapse of the uterus with cystocele. The last two years the symptoms have increased, with some vaginal bleeding, and the tumor mass had become tender and somewhat annoying. She is troubled with more or less constipation for which she has taken a cathartic. She has been slightly nervous and has had attacks of nausea and vomiting. She has had some urinary frequency. The uterine prolapse became more pronounced and very troublesome so that she thought the advice of her physician, Dr. Hugh Arey, who went into her history thoroughly, made a tentative diagnosis of a lithopedion, inserted a pessary to relieve her of the symptoms associated with the prolapse, but advised an operation. She was relieved somewhat of the discomfort from the prolapse but her nausea and vomiting continued and

she had increased tenderness in the region of the tumor. She reluctantly decided to see a surgeon.

Upon physical examination the head and chest were found to be normal. She had some pain on pressure over the gallbladder area. Her abdomen was prominent. A large, slightly fixed, exceedingly hard, some-

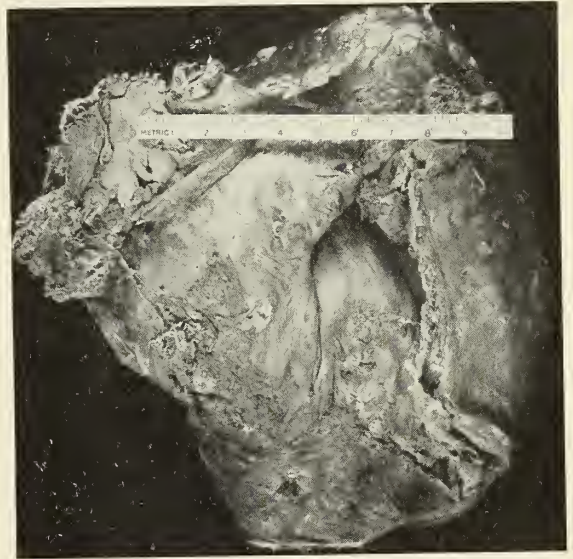


Fig. 1.

what tender nodular mass was easily palpable in the lower left abdomen. The mass extended up to the umbilicus. On pelvic examination a complete prolapse of the uterus with a pronounced cystocele and an incompetent perineum was found. Her temperature was normal, the pulse rapid but strong and regular. Her blood pressure was systolic 150; diastolic 80. Her leukocyte count was 6,000, hemoglobin 87, bleeding time three minutes and 40 seconds, and the clotting time five minutes. A trace of albumin was found in the urine. A clinical diagnosis was made of (1) lithopedion of forty years standing; or (2) dermoid cyst. The possibility also of a diseased gallbladder was considered.

An x-ray showed a large tumor mass approximately seven and one-half inches in diameter, the upper border reaching the umbilicus, the lower border low in the pelvis. The conclusion of the roentgenologist was either dermoid cyst or an ectopic pregnancy.

The patient was operated upon July 6, 1933. Ethylene and ether were used for anesthesia. Through a median incision a hard nodular tumor seven and one-half inches in diameter presented. The tumor was continuous with the distal three-quarters of the left tube. The tube had apparently dilated to accommodate the growth. Five inches of the upper and left portion of the tumor was attached to the omentum. Both ovaries and the remaining tube were normal. The uterus was normal in size, but the elongated ligaments allowed a complete prolapse. The other abdominal contents were normal except the gallbladder, which was enlarged and contained many medium sized and small stones. The tumor was easily lifted out of the abdomen and its attachments severed. The left tube was removed with the tumor. The uterine prolapse as well as the cystocele were then corrected by removing the central portion of the fundus of the uterus down to the internal os, and fixing the outer portions of the lateral uterine wall to the fascia of the recti in the lower angle of the abdominal wound. The abdomen was closed in the usual manner with supplementary dermal stay sutures.

The condition of the patient during the operation was good. The temperature the first and second day was 100 to 102 degrees and 99 on the third day. She had very little vomiting the first day, none thereafter, and some pain which was relieved by hypodermics of morphine gr. 1/6 and atropine gr. 1/150 occasionally dur-



Fig. 2.

ing the first three days. A retention enema was given every four hours for two days. She had no distention. The intake and output soon became normal.

Nine days following the removal of the lithopedion a second operation was performed to remove the gallbladder and stones. Local, gas and ether anesthesia was used. A modified Bevan incision was made. The gallbladder was enlarged twice the normal size and contained numerous stones ranging in size from one to two centimeters in diameter, irregular and faceted. The gallbladder was irregular and surrounded with friable adhesions. It could not be brought into the wound opening. It was removed after ligating the cystic duct. The cystic artery was clamped with a forceps which was left in as a suture substitute on account of the friability of the tissue and the inaccessibility of the vessel. The abdomen was partially closed in the usual manner with four supplementary stay dermal sutures.

The patient's condition on leaving the operating room was good. She had very little nausea and vomiting after the first day. There was the usual slight rise of temperature and pulse for two or three days following the operation and she required a narcotic occasionally during the first four postoperative days. Her position was changed occasionally for several days. Three days after the operation the clamps were loosened and they were removed on the fifth day. The wound was in good condition and no bleeding occurred. Her recovery after the second operation was very satisfactory. She was in the hospital twenty-two days in all.

The tumor which was removed measured 22 x 16 x 16 cm. (Fig. 1). It was fairly recognizable grossly as a fetus. It was completely encapsulated in a fibrous and muscular sheath of from eight to ten millimeters in thickness. This membrane was adherent but not calcified. A section of the tube which remained attached to the tumor showed it to be a normal Fallopian tube, containing the lithopedion.

An x-ray (Fig. 2) of the tumor after removal, clearly showed the head of the fetus bent forward upon the thoracic cage, the spinal column, arms, and legs which are flexed and seen on either side of the forehead. The presence of the epiphyses as shown by the x-ray indi-

cates a full term fetus that has calcium deposited in the soft structures and a lithopedion of the third classification of Kuchenmeister.

By means of a band saw the tumor was cut open approximately in the midline through the spine and sagittal suture of the skull. The brain was a red brown homogeneous firm structure. The bones and dura were apparently normal. The umbilical cord was normal in appearance and inserted into a partially calcified but easily recognizable placenta.

The heart was beefy red and about the size of a large strawberry. The lungs were pigmented yellow and were soft and maccrated. The diaphragm, pleura, and pericardium were normal. The contents of the abdomen were remarkably normal in appearance, save for their somewhat dehydrated condition. The coils of the intestine were normal. The stomach was flattened and filled with a yellow mucoid material. The liver was red and flattened to three millimeters in thickness. The other organs were not grossly recognizable.

The skin, muscles, and long bones were all normal in appearance. The sex of the forty-year old fetus could not be determined.

Microscopic examinations showed some hypertrophy of the muscle of the left tube which was much dilated to accommodate the fetus. The outer layer of the sac was a vascular dense network of connective tissue and muscle. The arteries showed considerable intimal arteriosclerosis.

Sections of the brain, lungs, liver, muscle, nerve, bone, placenta and cord were all recognizable microscopically. The brain was filled with long typical cholesterol needles. There was considerable hyalin degeneration in all the organs. Striated muscle, bone and cartilage were the best preserved tissues. The liver was scarcely recognizable microscopically. Its parenchyma had largely disappeared and there were numerous granules of greenish pigment present. These pigment granules were possibly remnants of bile in the liver.

On September 13, 1933, when I last saw the patient, she was in very good health. She weighed 130 pounds, had had no headaches, nausea, vomiting or constipation. There is no prolapse of the bladder and no rectocele. Her color and general appearance are that of a healthy person and she is able to do much of her work.

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MALARIA

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Malaria is usually considered to be a disease of tropical climates, the habitat of the *Anopheles* mosquito. Lately, however, there have been reports that the *Anopheles* is also found in Minnesota. The cases usually seen in our state are those of the chronic, relapsing

type, in people who have migrated here from the South, where they suffered their initial infection some years previously.

It may, therefore, be timely, during the summer season when people are making vacation trips to all parts of the country, to call attention to malaria as a possible cause of pyrexia, chills and sweating, where physical examination may at first be essentially negative, and the cause of the symptoms doubtful.

Case Report

This state of affairs occurred in a woman, aged thirty-six, the wife of a dentist. When she was seen the afternoon of August 23, 1933, she complained of having felt very weak for the preceding two days. The same morning she had felt very chilly and feverish; later she perspired profusely. She also had a severe bilateral temporal headache, and a burning sensation in her epigastrium. Physical examination was entirely negative except for a temperature of 100.4°. The spleen was not palpable. Further questioning revealed that she had returned August 9 from a vacation trip through the South and East and that she had noticed gradually increasing fatigability since about the sixth of August. She remembered that while in Florida she had been bitten several times by mosquitoes. She said that the puncture sites were still a little tender on pressure, and that they itched occasionally.

A tentative diagnosis of acute malaria was made, and the patient sent to the hospital. About midnight she had a chill and a blood smear was made at that time. This beautifully showed enlarged red blood corpuscles containing merozoites, many of them in the process of rupturing the cell walls. Previous to the chill she had had two doses of quinine sulphate, 5 grains each, and the temperature rose to only 102°. The next morning the spleen was palpated three fingers below the costal margin. She was given neoarsphenamine, 0.45 gm., with the idea of aborting further chills, as suggested in Beckman's "Treatment." She was then placed on quinine sulphate, gr. 5, every two hours until tolerance was reached. She had no further chills, but each day had a slightly elevated temperature in the afternoon, less on each succeeding day. It remained normal after August 28 (fourth hospital day). Following the initial course of quinine, she was given a short rest period, then gr. 20 daily in divided doses for a week. Upon leaving the hospital on the seventh day, she was instructed to take gr. 10 daily for seven weeks. The spleen was not palpable on August 29.

The patient has had no recurrence of her symptoms to date and a blood smear made six months after discharge showed no evidence of plasmodia.

CARCINOMA OF THE LUNG (PRIMARY?) IN A CHILD OF SEVEN*

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PRIMARY carcinoma of the lung, once considered a very rare disease, has lately been found to occur more frequently than was formerly supposed. Since the publication in 1912 of Adler's monograph on Primary Malignant Growths of the Lungs and Bronchi a comprehensive literature on the subject has appeared, all tending to show that this condition is not so infrequent and that its incidence is increasing.

Simons,⁴ in his study of the work of eleven authors in the U. S. and Canada, comprising a total of 22,754 necropsy reports and covering a period of thirty-one years, shows an average of primary carcinoma of the lung in .6 per cent of all autopsies and 6.57 per cent of all cancers. This compilation reveals a gradual increase in the mortality percentage of pulmonary carcinoma from .5 per cent in 1910 to 1.55 per cent in 1930. These figures are similar to reports of its incidence in Germany. The age group from forty to fifty years shows the highest incidence, with several cases in the eighty to ninety year group. The youngest age we have been able to find of an authentic case is seventeen years.

Grossly, primary carcinomata of the lung occur as: (1) a single, small nodule producing slight or possibly no symptoms; (2) miliary carcinosis, which grossly resembles an early shower of miliary tubercles; (3) a nodular form involving as a rule only one portion of a lung, there being one or more nodules which are usually not confluent, the boundary line between tumor and lung tissue being sharply defined; (4) an infiltrating form, the most common, usually starting in the bronchial wall and infiltrating along the bronchial ramifications. Late in the process an entire lobe of lung may appear as a solid yellowish white substance encircling and obstructing a bronchus. Softening and cavitation may occur.

Histologically primary carcinomata of the lung are divided into adenocarcinoma, squamous cell, cylindrical cell, and encapsulated or medullary forms.

The case reported presents an unusual condition because of the age of the patient, the presence of all gross and microscopic signs of carcinoma and the added evidence of a cystic origin of this neoplasm.

Case Report

M. B., a girl seven years and one month of age when first seen complained of headache, vomiting and attacks of dyspnea. The family history was negative. She was normal at birth, was breast fed and had a normal infancy except for an otitis media when a year and a half old. She had chicken-pox at the age of two and influenza for a period of two weeks when three years of age, with fever, cough and nose bleed. Tonsillitis attacks occurred during the third and fourth years.

The patient was perfectly well until August 25, 1931. On that day she began to vomit, and had a moderate fever, general body aches and profuse perspiration. These symptoms continued for about five days. There was a slight cough, not productive; no pain except general body aches.

She attended school from August 31st until September 6th, although she complained of not feeling well. On September 6th she had a choking spell. The mother says that she acted as though something were shutting off her breath and she became quite blue. This dyspneic spell lasted about ten minutes. About this time (Sept. 6) she began to have a harsh unproductive cough coming in paroxysms two or three times a day and followed by spells of dyspnea lasting five to fifteen minutes. She was in bed most of the time for ten days although she ate her meals regularly. No sputum was raised with these coughing spells.

On September 20, after having been out of school for two weeks, she was well enough to go to church with the family and to attend school the next day, but was out on the 22nd because she "breathed hard and vom-

*Read before the annual meeting of the Southern Minnesota Medical Association, New Ulm, Minnesota, September 25, 1933.

ited once or twice." On September 23 I was called because her vomiting and dyspnea continued.

The girl was healthy in appearance, well nourished, well developed and in no evident distress, but complained of headache. Her color was normal. Breathing was slightly labored.

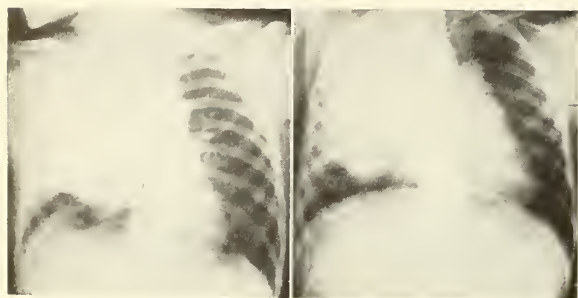


Fig. 1. Appearance before aspiration. (Left) Patient lying prone. (Right) Patient standing, showing well defined margins.

Examination was negative except for a slight fullness in the upper right chest with a diminished expansion in this area. There was a flatness on percussion over the upper right lung which extended down to the fourth rib anteriorly and the seventh dorsal spine posteriorly. Breath sounds were very distant and bronchial in character over this area. The rest of the lung area was normal except for a few crepitant râles heard in the lower right axilla. The heart apex was displaced slightly to the left.

A resolving pneumonia or a localized empyema were considered.

Following the first examination her condition changed very little except that the vomiting and headache ceased, but she had several spells of difficult breathing, coughed a little more and expectorated a small amount of white frothy sputum.

On October 6, she complained of pain in the right side of the chest for the first time and raised a little blood-tinged sputum. The temperature was 99.4°, pulse 80, respiration 26; w.b.c. 8,750; r.b.c. 4,100,000; hb. 78; Mantoux negative. There was some difficulty in breathing which seemed to be an inspiratory obstruction. X-rays showed a rounded opaque shadow occupying the upper two-thirds of the right side of the chest, and displacing the heart and the mediastinal structures to the left.

A paracentesis was performed the following day under local anesthesia, the fifth intercostal space in the right anterior axillary line being chosen. Some 240 c.c. of a markedly bloody fluid were obtained. More respiratory difficulty was experienced immediately after aspiration.

From October 7 to 12, there was no change in symptoms except more difficulty in breathing. On October 12, 270 c.c. of bloody fluid were aspirated with no change in physical findings. X-rays were taken after the aspiration. The patient gradually began to have more trouble in breathing and seemed to have an inspiratory obstruction. She became markedly cyanotic about the head and neck and died less than an hour after the second aspiration, after an illness of seven weeks.

Postmortem

Consent was finally obtained to make an examination limited to the thoracic organs.

Findings.—About 50 c.c. of free bloody fluid were found in right pleural cavity. The left lung and pleura were normal. A rounded, tense tumor mass in the right upper chest, 4 to 5 inches in diameter, smooth in contour, replaced the entire upper and middle lobe of

the right lung, displacing the trachea and mediastinal vessels to the left. The mass was bluish-white in color and had a smooth, glistening capsule. Dense adhesions tied the upper portion of the tumor mass to the parietal pleura. The mass was not adherent to mediastinal structures. On incision of the capsule a small amount



Fig. 2. Appearance after aspiration.

of bloody serous fluid welled out. The mass consisted of a yellowish-white, marrow-like substance which was readily scooped out, leaving a capsule $\frac{1}{4}$ to $\frac{3}{8}$ inch thick. The right lower lobe was normal as well as the heart and pericardium. Sections of the wall and contents of the mass, the right and left bronchi, right lower lobe of the lung, both lobes of left lung and liver were removed for microscopic study.

Microscopic report (Dr. E. T. Bell, Department of Pathology, University of Minnesota).—"The tumor in the lung is very sharply circumscribed and enclosed in a dense wall of fibrous tissue. No tumor tissue is found outside this fibrous wall. On microscopic examination the tumor is found to consist of a very cellular epithelial tissue which in nearly all situations is arranged into incompletely formed glands. The tumor is therefore recognizable histologically as an adenocarcinoma. In view of the fact that the tumor is enclosed in a dense fibrous wall the interpretation of it as a primary tumor of the lung seems reasonable. One would feel more sure of its being a primary lung tumor if the kidneys and ovaries had been examined at the postmortem, but it is difficult to understand how a metastatic tumor of the lung would be enclosed in a dense fibrous wall." He says, in another report, "My diagnosis would be a primary carcinoma of the lung developing in a congenital cyst. This is a most unusual tumor. I have been looking through the literature to some extent but have not found any cases of primary carcinoma at this age or of this type."

We cannot offer this case as an absolute, incontrovertible case of primary lung neoplasm in view of the fact that we were not permitted to do a complete autopsy. It is open to controversy as to whether or not this tumor really originated in the lung or was a secondary growth—a metastasis from the kidneys, ovaries, or thyroid, but I feel that the case is sufficiently unusual to warrant being recorded.

The microscopic evidence supporting the theory that this is a primary carcinoma developing in a congenital cyst brings up for consideration a clinical entity which has just recently come to be recognized. The first re-

recorded American case of congenital cystic disease of the lung is Pappenheimer's,³ recorded in 1912. Koontz² reported a case in 1925 and reviewed the literature on the subject, recording 108 cases, all European in origin. Since then Eloesser¹ has reported five cases from his

proper, with more or less diffuse cystic degeneration of the lung. The two forms may coexist.

A rather complete study of the literature reveals no recorded cases of carcinomatous degeneration of a congenital cyst, similar to the one here reported.

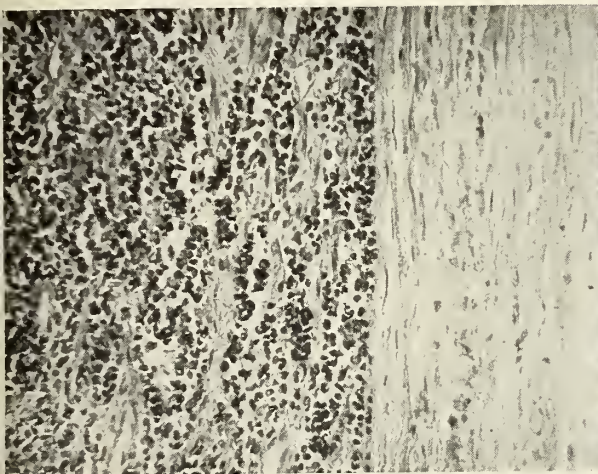


Fig. 3. Section of tumor and dense fibrous wall which completely surrounds tumor.

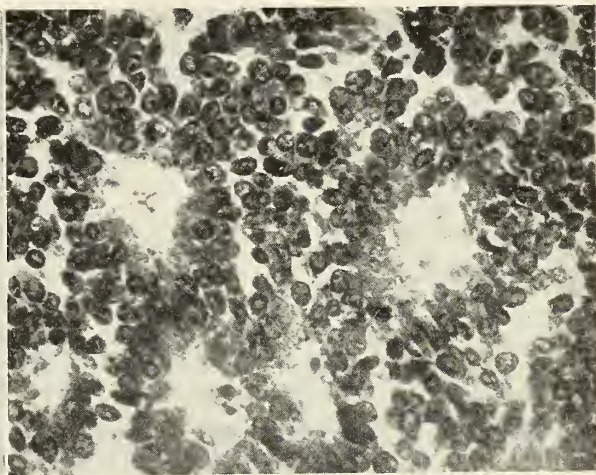


Fig. 4. Arrangement of cellular epithelial tissue in the form of glands is very evident.

own practice. Drs. Wood and Garvin,⁵ of the Mayo Clinic, reported five cases of congenital cystic disease of the lung in March, 1933. Two of these cases were confirmed by bronchoscopic examination and lipiodol injections.

Congenital cysts of the lung occur in two forms: one the solitary cyst, and the other, cystic disease

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"YOU KNOW I HAVE TWO COWS!"

A professor of Economics at an Iowa college is a realist,—and a good teacher. So affirms A. L. Killian, of Cedar Rapids. In one of the professor's classes was a student who was head of the campus socialist activities and who never missed an opportunity to preach equality of income. In a recent examination one of the questions allowed him free play to expose his favorite doctrine. The professor, in announcing the result of the examination to the class, stated that he had decided upon a new system of grading. He had added up all the grades and found the average and was giving each student this average.

Whereupon the young disciple of Dr. John Dewey arose and expostulated with some heat.

"It is not fair," he said. "Here I have worked hard, have stayed home and studied when other members of the class went out to see the football team practice; have denied myself social parties—even the Prom—in order to keep my studies at top marks. It isn't right to give me the same grade that you give all the others."

The professor reached for the student's examination paper and replied:

"I got the idea from you," and read an excerpt. Whereupon the class guffawed loudly.

The professor said quietly that perhaps students had better be graded as they had been graded for hundreds of years, recognizing the various degrees of individual merit and application.—*Nation's Business*, June, 1934.

ALBERT ABRAMS REDIVIVUS

The Bureau of Investigation has reported on the Micro-Dynameter which is an exceedingly impudent attempt to exploit anew the so-called electronic reactions of Abrams. The idea of special vibrations for different diseases can be found among the concepts of ancient centuries. But the engineer who would revive the Abrams doctrine has introduced new wrinkles, which must be the product of a training in engineering. The Micro-Dynameter of Mr. Ellis has been exhibited at a meeting of the Inter-State Postgraduate Medical Assembly. A few of the physicians who derive their scientific pabulum through that organization have apparently invested in the device and thereafter been unable to find it of the scientific worthiness which at the time of investment it seemed to possess. Moreover, a so-called medical periodical, *Clinical Medicine and Surgery*, has aided promotion of the device through its advertising columns; indeed, Mr. Ellis flaunts a letter from the editor of that publication, Dr. George B. Lake, in support of his contentions. It seemed when the late Abrams passed from our midst that his cult would pass soon from the scene. Little has been heard of Abramsism since that time, yet now like a spirit from beyond the sepulcher emerges the Micro-Dynameter of Mr. Ellis, and a medical organization and a medical periodical are available to help rap the tables and shake the tambourines to assist the materialization. (*Jour. A. M. A.*, January 6, 1934, p. 49.)

EDITORIAL

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BUSINESS MANAGER

J. R. BRUCE, Saint Paul

Volume XVII JULY, 1934 Number 7

The State Meeting

A perusal of the program of the State Medical Association meeting to be held July 15 to 18 in Duluth indicates that this year's meeting promises to be second to none, as far as our annual meetings are concerned. We regret that space does not permit the publication of the extensive program.

Scientific demonstrations which have proved so instructive in connection with the American Medical Association meetings by enabling one specialist to see what is going on in other specialties are being utilized more and more in our state meetings. Time on the program has been set aside for these demonstrations.

Clinics have not been overlooked and the innovation of last year of having programs furnished by the various societies of specialists in the state will be continued this year. The bulk of the program will consist of general assemblies and sectional medical and surgical gatherings.

The commercial exhibits constitute an essential part of the convention and it is mutually important that they be visited, and, what is more to the point, patronized.

Our program committee has done an excellent

piece of work . . . several distinguished guests will appear on the program . . . Duluth in July should be superb . . . most of us need to get away for a few days—a few good reasons for attending the Duluth meeting.

The Cleveland Meeting

From every angle the 1934 session of the American Medical Association was an unqualified success. Cleveland is an ideal convention city. The various local committees deserve much commendation for the delightful entertainment provided. The hotels, of which the city has many, did a great deal to add to the comfort and pleasure of their guests.

The exhibits, both scientific and commercial, were unusually varied, and displayed as they were in a capacious hall afforded excellent opportunity for inspection.

Cleveland itself is a city of beautiful proportions, its many handsome buildings combined in such a way as to produce a strikingly artistic whole.

The total registration was well over six thousand. The section meetings all held in one magnificent building, The Cleveland Public Auditorium, were well attended and many interesting subjects presented. The meetings of the House of Delegates under that "Admirable Crichton" Speaker of the House, Dr. F. C. Warnshuis, of Michigan, might well excite the envy of the most astute parliamentarian, and to Dr. Olin West, for his gracious, kindly consideration, one feels a debt of gratitude.

Among the outstanding problems considered, the House went on record as being unalterably opposed to any change affecting the present existing relationship between physician and patient.

The hospitalization and care of World War Veterans under the present system was regarded as inimical to the profession at large.

The advertising of medicinal preparations over the radio brought in a resolution of condemnation.

The subject of birth control was considered as a sociologic problem rather than medical.

The desirability of the use of drugs of the United States Pharmacopeia and the National Formulary was the subject of a resolution, and it was regarded of prime importance that all staff members of accredited hospitals be members of their local county and state societies.

A resolution was passed extending an invitation to The Canadian Medical Association to meet in joint session at Atlantic City in 1935.

The address of the president, Dr. Bierring, on "The Family Doctor and the Changing Order," which appears in the *Journal* for June 16, was well received. Containing as it does much food for thought it should be read and pondered upon by every physician who has the interest of the profession at heart.

The election of Dr. J. S. McLester of Birmingham, Alabama, as president-elect is a well deserved recognition of his many attainments.

J. T. C.

Preparation of Manuscripts

Most of the manuscripts submitted to MINNESOTA MEDICINE are well prepared and show evidence of care, not only in the use of English but in form as well. This statement applies particularly to articles submitted by authors whose writings frequently appear in print. A number of manuscripts, however, show evidence of carelessness in preparation or ignorance of the fundamental rules of composition, or both. These are the bane of the editor's existence.

A well written article reads so easily that few realize the amount of hard work it represents. The facile writer is rare. Even Osler, whose contributions were couched in such simple diction and were so clear in their meaning, spent much time and effort in going over his manuscripts, rewriting, transposing phrases and substituting words, before he was satisfied with the result. Medical men who consider themselves poor writers should derive considerable consolation from the contemplation of this fact.

"Brevity is the soul of wit." A prominent surgeon was once heard to remark at the conclusion of an address that anyone who spoke longer than twenty minutes was a darned fool and anyone who listened more than twenty minutes was a damned fool. How often the underlying truth of this statement is ignored. The same holds for written articles. One of the best articles ever

written on appendicitis was one by Wilkie (Surg., Gynec. and Obst., July, 1927) which covered three scant pages. Brevity recommends a manuscript.

To take up more in detail the conventional requisites for a well prepared manuscript: The title should be carefully chosen so as to indicate specifically the subject matter. This is important when it comes to indexing.

The author's name is usually followed by M.D., indication of the possession of other degrees or titles being a matter of personal preference. There has been a distinct tendency of late towards the omission of such titles. University staff appointments frequently appear, following the author's name. Membership in a clinic or group, or other information regarding the author which may serve to place the author in the reader's mind, may well appear in a footnote, and this procedure might well be expanded.

The manuscript should be typewritten and double spaced for the convenience of printer and editor. To make corrections in a single spaced manuscript is well nigh impossible.

Most articles should end with a summary. Readers commonly refer first to the summary to determine whether the article promises to be of interest to them.

A correctly prepared bibliography is the exception, rather than the rule. For the sake of uniformity arbitrary abbreviations, capitalization and punctuation are used. While reference to published bibliographies is of value, a medical writer should possess one of the excellent manuals* on the subject of medical writing for this information. These annuals also contain many valuable suggestions. We have recently adopted the alphabetic listing of bibliographic references for the sake of convenience. Bibliographies are, as a rule, not published unless definite reference to the authors appears in the text. The reason is perhaps obvious.

Without going more into detail on the subject we hope that our remarks will result in more careful preparation of manuscripts in the interest of economy, and we sincerely hope that anything that has been said will not deter those who find it difficult to write from making the attempt, but that it will rather spur them on.

*Simmons, George H., and Fishbein, Morris: The art and practice of medical writing. Am. Med. Assn., 1925.

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MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association

B. J. Branton, M. D.

W. F. Braasch, M. D., Chairman

J. C. Michael, M. D.

American Medicine Takes Its Stand

Ninety-eight thousand American physicians explicitly rejected socialization of medicine in America through their House of Delegates at the 85th Annual Meeting of the American Medical Association in Cleveland last month.

This tremendously important action came on the heels of a resolution favoring pre-payment health insurance, passed by the Regents of the College of Surgeons; upon an endorsement of the principle of health insurance by the House of Delegates of one of its state societies; and upon an energetic campaign on the part of the large Foundations that principally financed the Committee on Costs of Medical Care for social experimentation in medicine.

The College of Surgeons was sharply rebuked and a ten point platform was adopted. Against this platform, the experimenter in new forms of medical practice will henceforth be obliged to measure all his plans.

Thus did the American Medical Association clear the air for its component societies. Organized medicine will fight with renewed vigor for its traditional Articles of Faith: *that the physician is responsible to one person, alone, the patient, who freely selects and pays him; that no third person or agency must be allowed to step in between this patient and his physician.*

Following are the "ten points" themselves which form the social creed of the majority of physicians of the United States, but which have never before been so conveniently and so aptly expressed.

The Ten Points

1. All features of medical service in any method of medical practice should be under the control of the medical profession. No other body or individual is legally or educationally equipped to exercise such control.

2. No third party must be permitted to come between the patient and his physician in any medical relation. All responsibility for the character of medical service must be borne by the profession.

3. Patients must have absolute freedom to choose a legally qualified doctor of medicine who will serve them from among all those qualified to practice and who are willing to give services.

4. The method of giving the service must retain a permanent, confidential relation between the patient and a "family physician." This relation must be the fundamental and dominating feature of any system.

5. All medical phases of all institutions involved in the medical service should be under professional con-

trol, it being understood that hospital service and medical service should be considered separately. These institutions are but expansions of the equipment of the physician. He is the only one whom the laws of all nations recognize as competent to use them in the delivery of service. The medical profession alone can determine the adequacy and character of such institutions. Their value depends on their operation according to medical standards.

6. However the cost of medical service may be distributed, the immediate cost should be borne by the patient able to pay at the time the service is rendered.

7. Medical service must have no connection with any cash benefits.

8. Any form of medical service should include within its scope all qualified physicians of the locality covered by its operation who wish to give service under the conditions established.

9. Systems for the relief of low income classes should be limited strictly to those below the "comfort level" standard of incomes.

10. There should be no restrictions on treatment or prescribing not formulated and enforced by the organized medical profession.

In summary, the consensus was that the present standard of medical practice is superior to that afforded people generally in any other country in the world. If it is determined in any community that some experiment to change the method of administering medical service is desirable, observance of the principles adopted will remove many of the "disturbing influences" from such an experiment. In all such experiments attention must be sharply focused on the quality of medical service rather than primarily on any other factor.

Physicians and Relief

A critical situation will present itself for the consideration of the House of Delegates at the July meeting in Duluth.

Federal Emergency Medical Relief requires more attention to details of equitable operation (as it will doubtless be pointed out by responsible officials) than it is possible for those officials to give to it.

For physicians, more than service in a national emergency is at stake in this program, more than the justice or injustice of physicians' claims upon relief funds, or of restrictions imposed by local county administrators of those funds.

The fact is, as thoughtful men will readily agree, the entire complexion of medical practice in these United

States may well depend upon the successful operation of the current plans for medical care of depression victims.

If the present plan works smoothly, it will be a tribute to the wisdom, good faith and conscientiousness of the medical profession. It will also be a testimonial to the effectiveness and superiority of the private practice of medicine over State Medicine even in the care of public charges.

If it does not work smoothly, whether the fault is that of the profession or of state officials in charge of distribution of funds, the whole matter will be unkind. It will also serve as impetus to a proposal already broached in official quarters for county clinics for care of the indigent, and, eventually, for hired medicine in Minnesota and the United States.

Medical Field Worker

A proposal will undoubtedly be made in Duluth for the employment of a representative of the State Association to keep in constant touch with the offices of the State Emergency Relief Administration and with the details of each local situation throughout the state. Such a person could bring direct to the physicians in the state the significance of the ever-changing regulations and also present to headquarters the situation and point of view of medical men from first-hand knowledge.

Misunderstandings and misinterpretations are bound to occur, otherwise, on the part of all participants to such a scheme.

With the assistance of a medical field worker, however, these differences could be ironed out, local bitterness could be avoided and the whole machinery could be oiled for better and more efficient operation.

It is to be hoped that the delegates will give serious consideration to some such proposal.

Interesting Figures

Here are the figures on actual expenditures, to date, under the plan called "Medical Care in the Home."

The total amount paid out of relief funds in Minnesota for medical care, drugs and medicines and nursing, from July 1, 1933, when the plan was inaugurated, to March 1, 1934, is \$12,441.77.

The bill for nursing (estimated as small) is not separated from those for medical care on the Relief Administration books. The bills for medicine and drugs have been separately recorded only since January, 1934. The figure from January, 1934, to March, 1934, was \$12,091.71.

The total relief bill for the periods from July, 1933, to March, 1934, for all counties on relief was \$3,178,553.67. Clearly, emergency medical care in all its phases cost the government only .01 per cent of that amount. These figures were supplied to state society officials by F. M. Rarig, Jr., executive secretary of the State Relief Administration.

In comparison with the total bill, the amount spent for medical care seems small. It is large enough, however, and significant enough in all its aspects to warrant care on the part of the profession to see that it is well and satisfactorily spent.

Not Reactionary

The action taken by the House of Delegates of the American Medical Association last week on the subject of the socialization of medicine was neither emotional nor reactionary.

It was done after mature deliberation and study of the experience of other countries where socialized medicine is now carried on. Every physician should carefully read and re-read the comprehensive survey made of this subject by the Bureau of Economics which appeared in the April *Bulletin of the American Medical Association*.

It is frequently stated that, unless the medical profession takes the initiative in instituting some form of socialized medicine, the people will force it on them. (Note the editorial reprinted below.)

The people will do no such thing if they study the data made available by the numerous surveys of the subject made by the American Medical Association. One wonders who is responsible for this persistent propaganda which arouses prejudice and also proposes illogical and impracticable systems of health control. It is high time that the impractical theories sponsored by ill-advised Foundations for social reform were crushed at the source.

Medics Raise Defenses

One outstanding feature of the American Medical Association convention at Cleveland was the adoption of a professional "ten commandments" designed to define the policy of the association in opposition to the health insurance system advocated by the American College of Surgeons. The Association resents the attitude of the College of Surgeons and charges it with presuming to legislate for the entire profession though not thoroughly representing it.

There is much to be said against state medicine as a general condition of practice. If the decision were vested in the majority of professional sentiment as expressed through the A. M. A. the issue would probably be dead right now but such is not the case for considerations involved deal with matters of professional business policy rather than of medical technic and professional ethics. For that reason a voice will be claimed for the laity interest.

As the situation develops, the ten commandments may not definitely avail since they apply within the profession and do not reach all the influences which will operate in arriving at a decision.—*Saint Paul Pioneer Press*.

The principles that dictated "The Ten Points" have been handed down from the ages. They have been tested by time and they have been found to be necessary to good medical care, the world around.

When occasion demands it, these principles can be and have been modified to meet local demands. The fact that, in all essentials, they have survived all of the social and economic revolutions of history, is formidable evidence of their worth.

In a country the size of the United States there are bound to be special conditions peculiar to certain areas that may well alter, to some degree, the details of medical practice.

Organized medicine is studying these local problems. It is formulating plans, making experiments. The Iowa Plan for Care of the Indigent is one; the Detroit plan for financing medical care for low income groups is another; the Michigan plan is another.

The fact is, that few professional groups are as thoroughly awake to the problems and needs of the times as the medical profession. Few of them are brought as close to the needs and aspirations of men.

Health Insurance

Michigan Physicians Make Plans

The Michigan State Medical Society will shortly vote on a plan for health insurance for the lower income group of the state of Michigan.

This plan has been evolved at the direction of the Michigan House of Delegates by a special committee and at great expense. (One periodical estimates the cost, to date, at \$15,000.)

Dr. Henry A. Luce, Speaker of the House, and Dr. Nathan Sinai, D.P.H., who conducted several investigations for the Committee on Costs of Medical Care, went to England to make a first-hand study on the subject in January.

As a result of that trip and the report made to the House of Delegates in April, the principle of health insurance was approved, provided it is under the control of the medical profession.

Instruction is "Go Ahead"

The special committee was instructed to go ahead with plans for an experiment to be known as the Mutual Health Service plan, designed to provide adequate medical care to residents of the state within the less-than-\$1,500-a-year income class and above the indigent class. The vote on this instruction was 61 to 9.

Result: Michigan becomes the first state unit of Organized Medicine to experiment with social medicine in America.

The plan as evolved today has not yet been approved by the House of Delegates, to be sure. It awaits final action at the September meeting and that action may be influenced considerably by the attitude of the House of Delegates of the American Medical Association at its June session in Cleveland. Nevertheless, the entire proposal, whether accepted or not, will undoubtedly assume a special significance in the eyes of all organizations interested in medical practice in the United States.

Specifically, the Michigan committee was instructed: first, to discuss the general idea of the plan with employers and employees; second, to determine such legal action as might be necessary for a mutual health service; third, to prepare a detailed plan for final action in September.

Thus far, according to report, the plan involves payment into a central treasury of a stipulated sum for each person assured of medical service. And medical service in each case is to include the services of a general practitioner, a specialist, dentist, nurse, hospital and druggist.

Costs

The cost for each person is tentatively figured at \$27.88 per person for each year. The committee estimates, further, that the average family consists of four and a fraction persons. It has therefore set \$118 as a tentative annual fee for which each family, regardless of whether it has two or a dozen members, may subscribe to the service.

Three cardinal points are stressed in the program.

1. Free choice of physician by the subscribing family.

2. Absolute control of the program by the medical profession (appropriate administrative machinery is sketched in the plan).

3. Exclusion of any effort to exploit health insurance commercially.

The committee and the society hope to avoid the evils and weaknesses apparent in European health insurance projects. They disapprove, for example, of the combination of the dole (unemployment insurance) and health insurance as found in England.

If a working plan is finally approved by the delegates it will be tried out, according to report, in some as yet undetermined county unit before it is undertaken as a state-wide project.

Detroit Objects

In spite of the overwhelming vote of the Michigan House of Delegates, all county units of the society do not appear to be in sympathy with the proposed experiment. Vigorous dissent is indicated in the following editorial quotation from a recent number of the *Detroit Medical News*, bulletin of the Wayne County Medical Society. Says this editorial:

"The sociologists state it is inconceivable that any form of health insurance can exist without unemployment insurance. The writer must agree that to try to do this spells evasion, cowardice or stupidity. This is our major objection to the plan proposed at the state meeting. Any honest approach to a disorganized, disjointed, creaking social system will not . . . put into effect a plan that seeks to bolster up economic inequalities. . . .

"For a glance at the cost of State Medicine and its satellites, let's look to Britain, a land with one-third the population and one-half the wage standard of America. Neville Chamberlain, Chancellor of the Exchequer, estimates the yearly expenditure of the British Isles, ending March, 1935, for protection, health and dole as follows:

Army	31,418,000 pounds (\$161,000,000)
Navy	47,208,000 pounds (\$244,000,000)
Health and Labor.....	147,526,000 pounds (\$763,000,000)

"Health and Unemployment insurance cost \$520,000,000 more than the cost of building and maintaining the world's biggest navy!

"Let's have the sociologists (well paid by Foundations) sell health insurance and its expensive companion, unemployment insurance, to the thoughtless people (including the doctors) who will hereafter and eternally fight the exorbitant taxes necessary to maintain these bureaucracies in political-spoils America (is Britain as full of political pork as America?) until the load becomes unbearable. . . ."

"Verily, after Health Insurance will come the Deluge!"

The "Copeland Bill"

From the Congressional Record-Senate, Wednesday, May 16, 1934:

Mr. Copeland (Senior Senator from New York): Mr. President, I judge from the interest taken in the vote (on whether or no the Senators would take time for a consideration of S. 2800, once known as the "Tugwell Bill") that the bill is understood by the Senate . . . or at least the Senators think they understand it. As a matter of fact, propaganda put out against the food and drug bill are propaganda founded upon opposition to the first bill known as S. 1944. The bill which we have before us is the third revision of the bill. The bill which is now pending has almost no relationship to the bill which met with such violent opposition throughout the country.

I beg the Senators to believe me when I say this. In the interest of the public welfare and of the public health, before they determine to cast their votes against the passage of the measure, I ask that each Senator shall take the pains to ascertain for himself exactly what is contained in the bill. I am frank to say there has been manifested here today a degree of opposition which indicates difficulty in passing the bill at this late date in the session.

Mr. Lewis (J. Hamilton Lewis, Senator from Illinois): Mr. President, may I ask the Senator if the bill contains provisions that would justify its being known as the "Tugwell bill" against which we have received so many telegrams and letters?

Mr. Copeland: The bill to which I referred, known as Senate bill 1944, which has been revised three or four times since its introduction, is known to the public as the "Tugwell bill."

Mr. Lewis: But not the present bill?

Mr. Copeland: It is not the Tugwell bill that is now before the Senate. I have had the ambition, indeed, that it might be sometime called the Copeland bill.

Mr. Lewis: If it is a good bill, it should be known as the Copeland bill. If it is a bad bill, of course, it may be called the "Tugwell bill." (Laughter.)

Mr. Copeland: As a matter of fact, the first bill was prepared by various authorities and experts and the permanent employees of the Department; and the Tugwell bill, bad as its reputation is, in my opinion, does not deserve the bad name it has. However, that bill is not under consideration.

Mr. President, I am anxious on behalf of the committee to perfect the bill, so that, even though we may not come to the point of passing it, the bill may be in such form that *some future, and perhaps wiser, Congress may see fit to enact it. . . .*

* * *

This then is the status at a late date in the session of the "Tugwell-Copeland Bill."

It is obvious that the powerful propaganda against the bill goes on unabated in Washington and the likelihood of bringing the measure to a vote seems remote.

In the meantime, the out-dated Federal Food and Drugs act of 1906 must stand as best it may between the public and the gigantic food and cosmetic and patent

remedy industries. It is obvious that these industries find aid and comfort in things as they are.

Ramsey County Plan

Medical Society to Take Lead in Summer Round-Up

A committee of the Ramsey County Medical Society appointed by its president recently met with a committee of the Saint Paul Council of Parents and Teachers to discuss the Summer Round-Up in Ramsey County.

The committee of physicians included Drs. J. C. Hultkrans, J. N. Dunn, and A. C. Schulze. The Parent Teachers Association committee was composed of Mrs. S. E. Linsley, Mrs. E. L. Baker and Mrs. H. C. James.

They reported as follows:

"The Ramsey County Medical Society was wholeheartedly in favor of the examination of the pre-school child. This movement by the Parent-Teacher Association to secure a physical examination and the correction of physical defects of all children before entering the school for the first time is of far-reaching importance, not merely for the welfare of these children but also as an educational procedure.

We felt that the method by which the examinations had been done in the past was incomplete, that it was impossible to examine adequately these children in groups. We advocated that these examinations should be done by the family doctor in his office. The educational feature of this movement was also emphasized and, as part of its objective, was included the education of the parents to the value and importance of periodic examinations of apparently healthy children. We assured the Parent-Teacher Association of our wholehearted support in the Summer Round-Up if it were conducted in this manner and that the family doctor would be willing to examine in his office, as he has in the past, any deserving child. After considerable discussion, the Committee of the Parent-Teacher Association agreed to eliminate any examinations en masse.

Doctors To Talk

"The following is the plan suggested: That the Parent-Teacher Association hold evening meetings at the various schools in March to which the fathers and mothers of the pre-school child be invited; that the programs at these meetings be directed primarily towards the education of the parents to the value of an adequate examination of the pre-school child; the speakers on this program to be a person from the Parent-Teacher Association, who is to give a little of the history of the Summer Round-Up as a major activity of the National Organization of the Parent-Teacher Association, and the purpose which they hope to accomplish; a member from the school to show the benefits and value to the child derived in the past even from incomplete examinations; and a member from the society to talk on some selected topic to show the benefits derived by an apparently well child from such examinations thoroughly done. Outlines should be prepared by the committee from the medical society so that the talks would be uniform and cover the main points. It was suggested also that it might be advisable to have a mother whose child had benefited to appear on the program as a sort of testimonial. The regular charts would be distributed at this meeting, and the number of families in each district divided among the workers, so that, for example, one worker would be responsible for and see that ten children had the examination and the correction of the remediable

physical defects found in such examination before the fall term started.

"This committee of the Ramsey County Medical Society recommends the adoption of this plan as agreed to by all members of these combined committees. It recommends that we attempt to give publicity to this plan through the press."

Official action will be taken soon by the Parent-Teacher Association.

Examining Westchester Children

An interesting Summer Round-up plan is in operation this summer in New Rochelle, Westchester County, New York.

The Westchester County Medical Society and the county's Parent-Teacher Association are jointly backing it.

"The idea behind this particular movement," says a recent editorial in the *New York State Medical Journal*, "is that it shall not be just another child health effort, but shall be the start of a continuous, life-long health program, to be carried on as completely as possible under the guidance of the family physician acting as health counsellor."

"It is, to begin with, a health examination of all children between the ages of two and five. But here again we have a new feature, because they are to be divided into three classes. First, all the mothers who can afford to do so are to be urged to take the children to their family physicians for examination in their private offices. Next, for those who cannot afford this, special pay clinics will be provided at a fee of \$2.00, conducted in their own offices by physicians especially selected by the local medical society. Finally, children of the indigent will be examined at the free clinics of the Baby Welfare stations, largely by the same doctors who conduct the pay clinics. All these classes of examinations will be thorough and painstaking but the first will include procedures that cannot be given in a free or a \$2.00 examination. All examinations will include a tuberculin test, if the parent consents, a feature suggested by the Westchester Tuberculosis and Public Health Association.

Family Lesson

"If this plan is successful in New Rochelle, it will be recommended for adoption in the rest of the county. It may well be watched by other counties, too."

"The pre-school examination idea has become very popular throughout the country. Parent-Teacher associations are strongly in favor of it. Too often, however, children have simply been rounded up en masse and examined wholesale at special free clinics. As a result, examinations have been sketchy and parents have been habituated to the idea that medical care is free. The Westchester plan is more far-seeing. It starts the little feet on the pathway to a longer and stronger life and teaches the whole family that real health service is worth saving for and paying for and is worth all it costs in the end. *It is a lesson the whole country needs to learn.*"

Call the Police

An unusual number of drug addicts are reported to be hounding doctors' offices these days. When the physician attempts to take a history or make an examination they disappear or try to make trouble.

Just why there should be more of these callers than usual is not entirely clear. But attention of all physi-

cians should be called to the danger. They will assist the authorities and protect themselves if they will call the police immediately.

Minnesota State Board of Medical Examiners

Spring Valley Woman Continued on Probation

State of Minnesota vs. Elizabeth Schulz

Mrs. Elizabeth Schulz, farm woman, Spring Valley, Minnesota, appeared before the Honorable Norman E. Peterson, Judge of the District Court at Preston, Minnesota, on June 4, 1934. Mrs. Schulz had been ordered by the Court on May 9, 1934, to appear before the Court at Preston.

Judge Peterson granted a motion by Mr. David A. McVeety, County Attorney of Fillmore County, to dismiss the second charge of practicing healing without a Basic Science certificate, against Mrs. Schulz. The Court was informed by Mr. McVeety that the defendant was no longer engaged in the practice of healing. Judge Peterson questioned Mrs. Schulz directly as to whether or not she was practicing healing, and the defendant informed the Court that at no time since her arrest on January 11, 1934, had she treated any one. Judge Peterson, however, continued Mrs. Schulz on probation until the November, 1934, term of Court at Preston, Mrs. Schulz having pleaded guilty on May 9, 1934, to a charge of practicing healing without a Basic Science certificate following the death of Russell Prinsen, who had been under Mrs. Schulz' treatment for diabetes. Mrs. Schulz is under a suspended sentence of three months in the Freeborn County Jail, at the present time. One of the conditions of her probation is that she is not to practice healing in any form.

List of Physicians Licensed by the Minnesota State Board of Medical Examiners May 8, 1934

(April Examination)

By Examination

- Bair, Hugo Linden, Harvard, M.D., 1929, Rochester, Minn.
- Baker, Thos. Williams, U. of Pa., M.D., 1931, Rochester, Minn.
- Brink, Norvel Otto, U. of Minn., M.B., 1933, St. Paul, Minn.
- Buchstein, Harold Ferdinand, U. of Minn., M.B., 1933; M.D., 1934, Minneapolis, Minn.
- Buchtel, Henry Augustus, Harvard, M.D., 1931, Rochester, Minn.
- Davis, Raymond Darius, U. of Minn., M.B., 1933, Duluth, Minn.
- Deissler, Karl Joseph, U. of Heidelberg, Dr. Med., 1931, Rochester, Minn.
- Donovan, Daniel Leo, U. of Minn., M.B., 1933, St. Paul, Minn.
- Erich, John Bernhardt, U. of Illinois, M.D., 1932, Rochester, Minn.
- Fait, Roman Vincent, U. of Minn., M.B., 1933, Minneapolis, Minn.

Fatherree, Thos. Jefferson, Jr., Tulane, M.D., 1932, Rochester, Minn.
 Gillespie, Delmar Robert, U. of Minn., M.B., 1933, St. Paul, Minn.
 Gillespie, Donald Leo, U. of Minn., M.B., 1933, St. Paul, Minn.
 Gordon, Philip E., U. of Minn., M.B., 1932; M.D., 1933, Minneapolis, Minn.
 Hauser, George Wesley, Ohio State Univ., M.D., 1932, Minneapolis, Minn.
 Hedemark, Homer Harold, St. Louis University, M.D., 1933, St. Paul, Minn.
 Johnson, Douglas Leonard, U. of Minn., M.B., 1933, St. Paul, Minn.
 Kerlan, Irvin, U. of Minn., M.B., 1933, Minneapolis, Minn.
 Kostick, William Robert, U. of Minn., M.B., 1933, Minneapolis, Minn.
 Lieberman, Nolton Senard, U. of Minn., M.B., 1932, St. Paul, Minn.
 Malvey, Kenneth P., U. of Minn., M.B., 1932; M.D., 1933, Moorhead, Minn.
 McKechnie, Robert Edward, McGill, M.D., 1931, Rochester, Minn.
 Mead, Newton Cromwell, Northwestern, M.B., 1932; M.D., 1933, Coleraine, Minn.
 Mills, John Harold, U. of Chicago, M.D., 1933, Rochester, Minn.
 Mulrooney, Raymond Edward, U. of Minn., M.B., 1933, St. Paul, Minn.
 Nettrour, Walter Scott, U. of Pittsburgh, M.D., 1931, Rochester, Minn.
 Noble, John Lawrence, U. of Minn., M.B., 1933, St. Paul, Minn.
 O'Brien, Veronica, U. of Minn., M.B., 1933, Minneapolis, Minn.
 Odel, Howard Miller, Northwestern, M.B., 1932; M.D., 1933, Rochester, Minn.
 Olson, Kenneth Lloyd, U. of Minn., M.B., 1932; M.D., 1933, Minneapolis, Minn.
 Pass, Isadore J., U. of Minn., M.B., 1932; M.D., 1932, Minneapolis, Minn.
 Robinson, Van Cooper, Northwestern, M.B., 1932; M.D., 1933, Rochester, Minn.
 Rossen, Ralph, U. of Minn., M.B., 1933, Minneapolis, Minn.
 Shima, Raymond Thomas, U. of Minn., M.B., 1932; M.D., 1933, New Richmond, Wis.
 Vickoren, Angvald, U. of Minn., M.B., 1933, Duluth, Minn.
 Thysell, Vernon Duane, U. of Minn., M.B., 1933, Minneapolis, Minn.
 Waldren, George Richard, Northwestern, M.D., 1927, Pembina, N. D.
 Watson, Wm. John, U. of Minn., M.B., 1933, St. Paul, Minn.
 Wulff, Marjorie, U. of Minn., M.B., 1933; M.D., 1933, St. Paul, Minn.

By Reciprocity

Foley, Maurice P., U. of Pa., M.D., 1931, Rochester, Minn.
 Havel, Harold William, Creighton, M.D., 1933, Omaha, Nebr.
 Petersen, Peter Carl, Univ. of Nebraska, M.D., 1932, Ogilvie, Minn.

National Board

Hays, Albert Theodore, U. of Minn., M.B., 1932; M.D., 1933, Norwood, Minn.

President's Letter

Our Annual Meeting

EACH year our annual meeting has grown in distinction and worth to its membership. The program of our 81st meeting, at Duluth, July 15 to 18, is about to be distributed to our members.

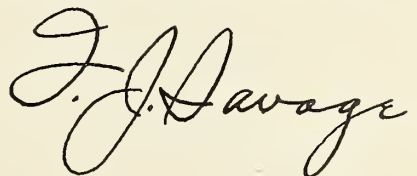
The Committee on Scientific Assembly began its task last fall and has worked faithfully to make this program at once practical and of exceptional scientific interest. The local Duluth committees have been on their toes, and have expended more time, thought and energy on this meeting than ever before in our history. They are determined to make it a success, and to create the feeling, "Let's go back again to Duluth."

The modern tendency of this type of post-graduate instruction is toward small group meetings to replace a portion of the traditional large general sessions. For the third year, emphasis will be placed upon small group instruction available in the exhibits and scientific demonstrations at this meeting. In spite of what appeared, at first, to be serious restrictions as to space, these demonstrations will be more numerous and more varied than ever before. They cover an interesting range and variety of subjects, all of them of practical interest to the general practitioner. They range in subject from carbon monoxide poisoning and dangerous cosmetics to fish tape-worm disease and injection treatment for hernia. For a complete list, you are earnestly recommended to study your program.

The Monday program will see a repetition of the successful special society meetings inaugurated for the first time at the Rochester meeting; also, there will be two mornings of dry clinics conducted by distinguished Minnesota men and out-of-state guests; a symposium on the latest developments in endocrinology; a novelty in the shape of a Medical Question Court, new to these meetings, at which a group of experts will be open to quizzing; a scientific cinema and two important evening meetings, one the banquet.

This meeting has more than a scientific importance, however, to organized medicine in Minnesota. These are days when our organization, our traditions and our professional standards are under fire as never before. At these meetings our social and economic policies are defined, and our organization cemented.

The profession and the public good need your personal interest in problems of medicine today.



President,
Minnesota State Medical Association.

OBITUARY

Dr. Hugh Custer Arey

1878-1934

Dr. Hugh C. Arey, a practitioner for more than twenty-eight years at Excelsior, Minnesota, passed away May 20, 1934, at his home.

A graduate of the University of Minnesota, Dr. Arey was a member of the Hennepin County Medical Society, Minnesota State Medical Association, American Medical Association, and was very active as a member of the Boy Scouts Council of the Minneapolis area, having special supervision of health and safety at the summer camps. In 1932 he was given the Silver Beaver award for distinguished service to boyhood by the Minneapolis Boy Scouts Council. Dr. Arey had also been very active in community relief work at Excelsior.

Dr. Arey is survived by his widow, three sons, Dr. Stuart Arey, James B. Arey and Hugh Custer Arey, Jr., and a daughter, Mrs. Edward M. Thompson, all of Minneapolis.

Dr. Harold Samuel Boquist

1888-1934

Dr. Harold S. Boquist was born in Red Wing, Minnesota, October 21, 1888. Graduating from the University of Minnesota in 1921, he had practiced in Minneapolis since that time, at one time being a resident physician at the Glen Lake Sanatorium. He was a member of the staffs of Asbury, Fairview and St. Andrews hospitals, with offices in the Medical Arts Building. He was also an instructor in the University of Minnesota Medical School and a member of the Hennepin County Medical Society, Minnesota State Medical Association, American Medical Association, the Hennepin County Tuberculosis Association and the Trudeau Society.

Following a two months' illness Dr. Boquist died June 12, 1934, at the University Hospital at the age of forty-five. He is survived by his widow; three sons, Howard, Harold and Lowell, and a daughter, Alice. He was a brother of Dr. E. T. Boquist.

Dr. Muret Leland

1874-1934

Dr. Muret N. Leland, Minneapolis, died May 28, 1934, at his home at the age of sixty.

Born at Wells, Minnesota, Dr. Leland obtained his degree from the College of Physicians and Surgeons in Chicago. After serving his internship at St. Elizabeth's Hospital, Chicago, Dr. Leland began practice in Wells, Minnesota. After ten years in this location he went to Minneapolis, where he practiced for a period of thirty years. He was a staff member of the Deaconess Hospital.

Dr. Leland was a member of Phi Rho Sigma medical fraternity, a Mason, and a member of the Hennepin County Medical Society, Minnesota State and American Medical Associations.

He is survived by his wife; a daughter, Elizabeth, and a sister, Mrs. Dan F. Bull, all of Minneapolis.

OF GENERAL INTEREST

Dr. J. W. Byram has moved from Echo, Minnesota, to Young America, Minnesota, where he is now established for the practice of medicine.

The award granted by the Southern Minnesota Medical Association to a senior in the Medical School, University of Minnesota, on the basis of character, scholarship and extra-curricular activities was presented this year to Meredith Guernsey. The recipient served his internship at the Minneapolis General Hospital and received his M.D. degree in June.

Dr. Robert B. J. Schoch was recently appointed Health Officer of Saint Paul under the new political régime.

Dr. Schoch received his degree from the medical school of Northwestern University, Chicago, in 1908, and after serving his internship at Grant Hospital, Chicago, began the practice of medicine in Saint Paul in 1909.

Except for a period of service in the army during the World War, Dr. Schoch has practiced continuously in Saint Paul. Enlisting as a first lieutenant in the medical corps, he was sent to Camp Green, Charlotte, N. C., and later spent some nine months over-seas with the 55th Engineers. While abroad he received his captaincy.

The appointment of Dr. Schoch to this responsible position has met with the general approval of his medical confrères.

Duluth Offers Relief To Hay Fever Patients

Those in charge of arrangements for the state meeting at Duluth in July have thought it advisable to call the attention of visiting physicians to the beneficial climate and topography of Duluth and vicinity for hay fever sufferers.

Situated as it is, immediately fronting Lake Superior, for a distance of seventeen miles, Duluth offers a haven for the average hay fever victim. It is bordered by rugged country abounding in evergreens and birch forests, and many lakes and streams, instead of cultivated fields with their associated weed disturbances. The Lake is the deepest inland body of water on the continent, is fed by springs, and has a maximum temperature change of only six degrees. The 32,000 square mile surface area of the lake acts as a natural air conditioner by removing dust and pollens from the air above it. Weather bureau statistics show that the prevailing wind direction is off the lake, and that temperatures exceeding 90 degrees occur on an average of one day a season.

Restless patients should find ample amusements in Duluth. Boat companies offer many cruises; trout fishing is good in small streams and in Lake Superior itself; the scenic North Shore Highway offers a delightful route for automobile rides of a hundred miles or more; golf courses, both public and private, are plentiful and in good condition.

Housing facilities are adequate. There are several fine hotels, some directly on the lake front; small cottages may be rented at Park Point, the natural barrier between Lake Superior and the harbor. More detailed information may be obtained for patients by inquiry to the Public Health Committee, Duluth Chamber of Commerce, or to the Hay Fever Club of America, Hotel Spalding, Duluth.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MEDICAL BROADCAST FOR THE MONTH

The Minnesota State Medical Association
Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 11:00 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of July will be as follows:

- July 4—(Holiday)
- July 11—The Modern Hospital
- July 18—Gastro-intestinal Upsets
- July 25—Diabetes, Heart Disease and Cancer

AMERICAN COLLEGE OF PHYSICIANS

The American College of Physicians will hold its nineteenth Annual Clinical Session in Philadelphia, April 29-May 3, 1935.

Announcement of these dates is made particularly with a view not only of apprising physicians generally

of the meeting, but also to prevent conflicting dates with other societies that are now arranging their 1935 meetings.

Dr. Jonathan C. Meakins, of Montreal, Que., is President of the American College of Physicians, and will arrange the Program of General Sessions. Dr. Alfred Stengel, Vice President in Charge of Medical Affairs of the University of Pennsylvania, has been appointed General Chairman of local arrangements, and will be in charge of the Program of Clinics. Mr. E. R. Loveland, Executive Secretary, 133-135 S. 36th Street, Philadelphia, Pa., is in charge of general and business arrangements, and may be addressed concerning any feature of the forthcoming session.

MINNESOTA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

At the annual meeting of the Minnesota Academy of Ophthalmology and Otolaryngology the following officers were elected for the ensuing year: Dr. James S. Reynolds, president; Dr. Henry Grant, first vice president; Dr. Frank Knapp, second vice president; and Dr. Walter E. Camp, secretary-treasurer. The newly elected members of the Council are: Dr. Kenneth Phelps, chairman; Dr. George McGear; and Dr. Erling W. Hansen.

PROCEEDINGS of the MINNESOTA ACADEMY OF MEDICINE

Meeting of April 11, 1934

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, April 11, 1934. Dinner was served at 7 o'clock and the meeting was called to order at 8 o'clock by the president, Dr. A. E. Wilcox.

There were fifty-five members and one guest present. The scientific meeting was as follows:

IMPORTANCE OF NON-PAINFUL FEATURES

S. MARX WHITE, M.D.
Minneapolis

ABSTRACT

Because the pain commonly occurring with a sudden occlusion of a coronary vessel, or its branches, is similar to that felt with the angina pectoris of effort, clinical differentiation has lagged far behind the pathologic knowledge of these two conditions. The publications of Herrick in 1912, 1918 and 1919 aroused widespread interest in this country, and many others have added to the facts by which now a relatively definite differentiation can be made in the great majority of instances of either condition. There is much definite evidence to support the contention that when heart pain is prolonged beyond the briefest time following the cessation of effort causing it, there has been at that time a definite closure at some point in the coronary arterial system. Such a sudden closure may succeed weeks or years of angina of effort, or much more rarely may be succeeded by a series of such paroxysms.

Infarction with necrosis of a considerable portion of the heart wall is the result to be expected from such a sudden closure of a nutrient vessel. Since there is a wide variation in the degree to which collateral circulation is possible in the coronary arterial systems of different individuals, the size of the infarcted area is not dependent alone on the site of the closure.

With the necrosis of muscle certain features besides

the pain are prone to occur and should be given the most careful study during the early hours, days and weeks following the painful seizure. In this way only can the concrete evidences of actual infarction be brought to life. Leukocytosis, if searched for, will usually be found early, has been recorded within two and three hours, may be demonstrated for one to two weeks in some instances, is most often at 15,000 to 20,000, but may reach 30,000. Fever is commonly present but rectal temperatures are necessary to demonstrate it, as a rule, since there may be accompanying shock-like conditions which lower mouth temperatures. If the area of infarction is large enough to reach the epicardium over the ventral surface of the heart, a pericardial friction rub may be heard. The friction sounds may be very evanescent and are heard in only about 15 per cent of the cases. Frequent and careful auscultation is necessary to demonstrate it, as a rule. The pericarditis is part of the reaction of the living tissues against the neighboring necrotic areas, is not septic, and is practically never accompanied by massive effusion in the pericardial sac.

When the necrosis reaches the endocardial lining intra-cardiac thrombi usually form at the site. This process is manifested to the clinician only when embolism occurs in the arteries of either or both the pulmonary or peripheral circulation. Careful and repeated study for signs of embolism should be made. In the arteries of the legs and arms, particularly, records should be made on first examination of the case as to the presence and character of pulsation in all the peripheral vessels observable by the examiner. The clinical symptoms of embolism in the extremities may be minimal, but the disappearance of pulsation in a vessel known to have been previously pulsating, when taken in conjunction with the symptoms, may give conclusive evidence of embolism and thus by inference may lead to the recognition of the intra-cardiac thrombosis.

Lowering of blood pressure is a common accompani-

ment of infarction of the heart wall. This lowering may be extreme, and may be of decided prognostic significance.

Changes in the electrocardiogram have received much attention in the literature and may be of great importance in locating the lesion. They may help to determine whether the infarction involves the anterior or posterior walls of the heart or the septum. Changes in the electrocardiogram are absent in about 20 per cent of the cases when the conventional arm and leg leads alone are used. Anterior-posterior chest leads bring to light changes in the muscle not otherwise shown.

Studies for the signs of infarction are of great importance, since a patient with an infarcted area in the heart wall requires prolonged rest in order to assure the maximum integrity possible for that heart if survival occurs. If study has shown a considerable area of infarction to be present, experience has taught me to require a minimum rest period of eight weeks, this period to be prolonged if excessive or progressive damage seems probable, as shown by events during the recovery period. The occurrence of aneurysm of the heart wall, and of crippling sequelae, should be diminished by a properly protracted rest period.

Practically all the disturbances of rate and rhythm to which the heart is subject, have been seen accompanying coronary thrombosis. They may be of great importance in the management of the case. Their management will be given more extended consideration in another communication.

DISCUSSION

DR. MOSES BARRON (Minneapolis): This is a very interesting presentation of the events, symptoms and findings following coronary occlusion. Dr. White mentioned the many different signs and symptoms which we must consider in making a diagnosis. To illustrate the difficulties he pointed out a case where the patient presented all the findings of coronary thrombosis which later proved to be one of gallbladder disease. The more frequent error in diagnosis is in diagnosing gallbladder disease when coronary thrombosis is present, often to the great discomfiture of the surgeon who contemplates operation.

I would like to add one word in regard to the management of these cases with reference to prolonged periods of rest. We know that it is all very well to have a patient confined to bed for many months whenever there is an uncertainty as to how much damage exertion may produce. In our usual experience, however, we encounter patients who cannot afford to take such long periods of rest. We find that in the average case the patient may be allowed to sit up a little after three weeks of absolute and complete rest in bed. The sitting up must be very gradually increased by only a few minutes each day. Then the patient is allowed gradually to take a few steps so that in about another month he will be allowed to start doing a little work. In most cases the results of such management are almost as good as if they are kept in bed for four or five months. In fact, it is often surprising to find in young people, after letting them up and increasing their exertion slightly, how they come back to an almost normal condition.

I recall two cases of coronary thrombosis, one of three years', another of four years' standing, where the patients are now doing absolutely everything as if nothing had happened to their hearts. Examination at the present time reveals no evidence of previous myocardial injury. Though we must be careful not to put them to work too early, I think that after about three weeks of complete rest we can get good recovery in cases where there is going to be any recovery at all.

DR. J. S. GILFILLAN (St. Paul): Dr. White has made such a complete exposition of this subject there is very little more to be said about it. In coronary thrombosis the pain does not have to be a terrible pain. It may

be that a man goes to work in the morning and comes into the office about 5 o'clock in the afternoon saying that he has worked all day but he doesn't feel well. He may be found to have a coronary thrombosis. The point should be remembered and if you suspect a coronary thrombosis get the man hurriedly to some place where you can make the preliminary examinations and know what you are doing; get him to a hospital where you can make a leukocyte count, examine the peripheral arteries, possibly have a cardiogram; in other words, have some definite place to start from and then decide where to go. Then after four or five days have another cardiogram, and if you see it change right under your eyes, you can be sure that something is going on in that heart.

I do not believe in a prolonged period of rest. If the heart appears to be doing its work in six weeks, let the patient up. Usually one decides to keep the patient in bed six weeks and then begins to compromise with him. If the patient has been in bed for six weeks and during that time has shown no evidence of heart failure you can let him up gradually and let him get to work. The prognosis is not so bad, if they get through the first few hours. Of course the shock may be so great that the heart just quits. If the patient does not get up later on he may develop a weakened myocardium in the way of a congestive heart failure. But usually if they get through their attack and through a period of rest in bed, it is not often that the heart goes bad. In fact, I have seen people who were better afterward, for the blood pressure usually keeps down for a long time after. I think probably an estimate of six weeks' rest would be safe. In my observation I believe the greatest danger is another attack. I do not think the danger of muscular failure of the heart is very great.

DR. H. T. NIPPET (St. Paul): I have had some experience in my own family. Dr. Louis had attacks for fifteen years and he died of an accident. At postmortem there was entire occlusion of the right coronary artery. I think the mistake we make is to put our patients to bed too long. If a man has coronary disease in a mild degree let him enjoy life as much as possible, take life as it is, and don't make a cardiopath out of him. Treat these patients psychologically, treat them as human beings, and not too scientifically.

DR. MOSES BARRON (Minneapolis): I would like to say just one other word in regard to exercise. These patients should be kept absolutely at rest in bed for three weeks, then there should be another four weeks of a gradual progressive getting them up out of bed. To me this is one of the most important factors in the treatment; that is, that the getting up must be very gradual, at first sitting up only a few minutes and increasing by only a few minutes each day. Getting them up suddenly may do a great deal of damage.

DR. T. A. PEPPARD (Minneapolis): Dr. White has given us a very beautiful story of this very dramatic happening. He has traced the history of our information concerning it from the time when the diagnosis was considered impossible, to the time when a diagnosis of coronary occlusion is easily and accurately made. It has gotten to be not only the property of the medical profession but also the property of the laity and the legal profession. In fact, one of my patients quickly made his own diagnosis, which I, and the autopsy later, confirmed. One of the non-painful features is that of oliguria, or even anuria, which has led to the erroneous impression that there was some renal insufficiency. In considering coronary disease we need to differentiate clearly between coronary insufficiency and coronary occlusion. In regard to the matter of rest, I find that I am keeping my patients quiet a little longer than I did five or ten years ago. However, I do believe that a six weeks period of bed rest is entirely adequate. A considerable number of these patients are returned to a fair degree of activity.

DR. A. T. MANN (Minneapolis): I hesitate to say anything on this subject because this is such a complicated question and I do not know a great deal about

it. There is the nervous element and regeneration of the blood supply to consider. But I am wondering whether the internist can not learn something from the surgeon in regard to the strength of the wall they will get and whether or not the wall would be strong enough to let the patient up in three weeks or six weeks. We have had a great deal of experience with regeneration of tissue and have worked it out very carefully in connection with hernia operations. As I understand the facts, the regeneration of connective tissue, its circulation, its cellular elements and fibrous elements change so that the strong fibrous elements increase to make scar tissue quite firm at the end of two months. We have an understanding that a scar is nearly as strong at the end of two months and practically as strong at the end of three months as it ever will be. Of course, as a matter of fact, a scar goes on becoming stronger for ten years, but it is nearly as strong at two months and practically as strong at three months as it ever will be.

In the Army a great many hernia operations were done and the patients put back to work. When they were put back at the end of six weeks many of them recurred, and when put back at the end of two months many of them did not recur. Would that throw any light on this time element in bed in heart cases?

R. T. LAVAKE, M.D.,
Secretary.

Meeting of May 9, 1934

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, May 9, 1934. The president, Dr. A. E. Wilcox, presided.

There were fifty-two members and one visitor present.

THE DOCTOR IN FICTION

HAROLD E. HULLSIEK
Saint Paul

Dr. Hullsiek took for his subject the character and adventures of Roderick Random in the novel of that name by Tobias Smollett.

PULMONARY CARCINOMA

F. F. CALLAHAN, M.D.
Pokegama

Dr. Callahan read a paper with the above title and reported cases. Lantern slides were shown. (To be published separately.)

DISCUSSION

DR. E. K. GEER (St. Paul): It seems to me this paper of Dr. Callahan is very timely because it is unquestionably true that the incidence of primary bronchial carcinoma is on the increase and it is a question that challenges our diagnostic ability as well as our therapeutic ingenuity. The point regarding diagnosis I have particularly in mind is that in atypical pulmonary lesions if we will resort more frequently to bronchoscopy our diagnoses of this condition will be more frequent. Our treatment has been most unsatisfactory. We may prolong life for a year or two, or sometimes five, with x-ray or radium, but as surgeons become more skillful and experienced in chest surgery, they may and should have more to offer.

I think Dr. Callahan is to be congratulated on picking up these cases in a hospital that is devoted almost exclusively to tuberculosis. His horizon is not limited entirely by the tubercle bacillus.

R. T. LAVAKE, M.D.,
Secretary.

TRANSACTIONS of the MINNEAPOLIS SURGICAL SOCIETY

ANNUAL SYMPOSIUM on CANCER

Devoted to the Occurrence of Cancer in Private Practice in Minneapolis
and the Available Means of Treatment

MEETING OF APRIL 5, 1934

The President, DR. KENNETH BULKLEY, in the Chair

DR. KENNETH BULKLEY: It is a pleasure to welcome you all here tonight. Inasmuch as our program is a rather long one, I shall be very brief.

First, for the benefit of our guests, may I announce that the Minneapolis Surgical Society meets on the first Thursday of each month during the winter in the Lounge of this same floor and that each and all of you are at all times welcome. Our meetings are in no sense closed. They start promptly at 8:00 p. m. and terminate at 10:00. Our programs appear on the bulletin boards of various hospitals and can be regularly obtained from the secretary at cost.

Tonight, as you know, our subject is Cancer—the term being used in its broader sense. It is a most important subject for consideration by all branches of the medical profession, for there can be but little question but that, per hundred thousand population, deaths from cancer are constantly increasing.

We have in this Society two standing committees—one on fractures and one on cancer. Each of these committees is obligated yearly to prepare for us one meeting. Tonight it is the Cancer Committee's turn. Their problem has been a difficult one and in working it out they have done conscientiously a hard and excel-

lent piece of work. The committee chairman is Dr. J. Frank Corbett, to whom I now turn over the remainder of the meeting and whom I now, with the greatest of pleasure, present to you. Dr. Corbett.

DR. J. FRANK CORBETT: At the request of Dr. Kenneth Bulkley, I was honored with the chairmanship of the Cancer Committee and the following men, representing all of the designated hospitals, accepted membership in the committee:

J. F. Corbett, *Chairman*
F. A. Olson, *Secretary*

Ivar Sivertsen	Fairview
R. C. Webb.....	Asbury
W. C. Peterson.....	Swedish
L. H. Fowler.....	At Large
Martin Nordland	Northwestern
A. A. Zierold.....	General
S. H. Baxter.....	Hillcrest
A. E. Johnson (by invitation).....	Swedish
J. M. Hayes.....	St. Mary's
J. A. Johnson.....	Eitel
O. J. Campbell.....	Abbott
Daniel MacDonald	Deaconess
Kenneth Bulkley	Northwestern
Verne S. Cabot.....	St. Barnabas
Wm. T. Peyton.....	University

COMPARATIVE RESULTS BEFORE 1922 (LOW VOLTAGE) AND AFTER
1922 (HIGH VOLTAGE AND "SATURATION" TECHNIC)

	1902 to 1922 Low Voltage—Variable Technic		1922 to 1928 High Voltage and "Saturation"	
	3 Yrs. Per Cent	5 Yrs. Per Cent	3 Yrs. Per Cent	5 Yrs. Per Cent
Pre-operative and postoperative—all classes.....	55	47	69	55
Postoperative and with no axillary glands.....	96	84	96	94
Postoperative with axillary glands.....	63	55	70	73
Postoperative—all classes.....	59	49	80	77
Recurrence and metastatic—all classes.....	39	19	34	24
Primary inoperable—all classes.....	42	30	42	30
Primary operable—clinically positive.....	87	87	93	69
Average results in all cases treated.....	48	33	56	40

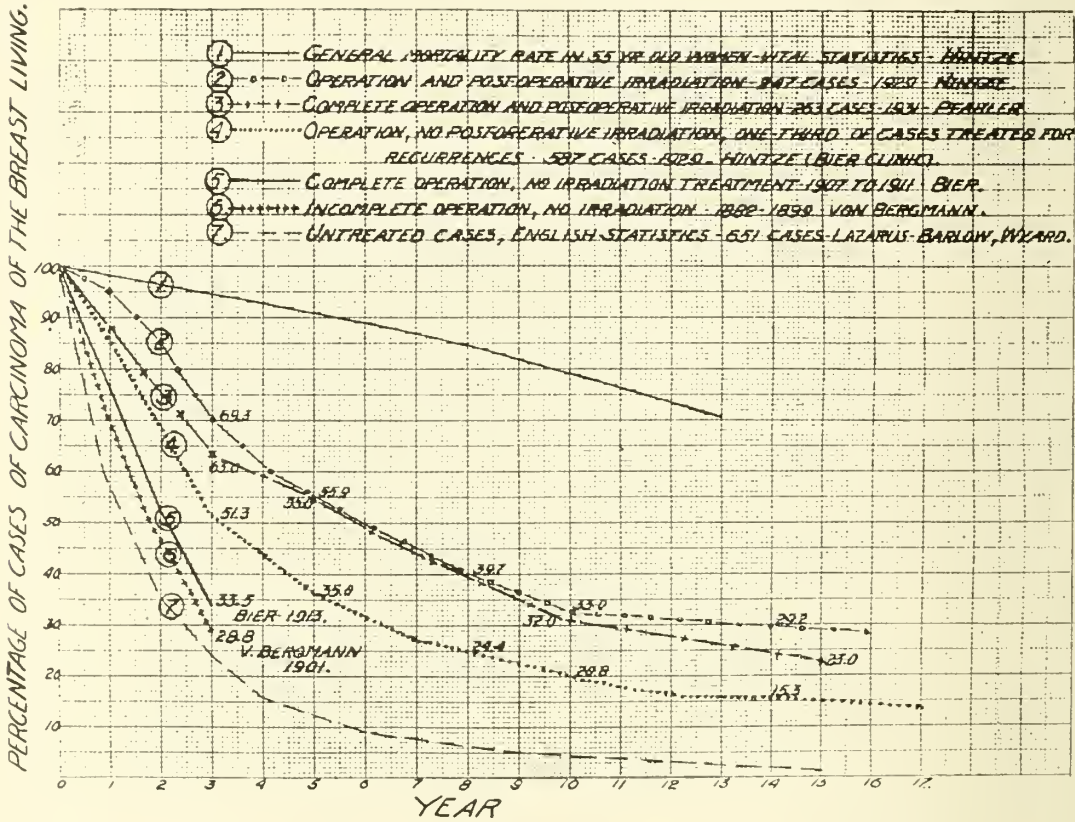


Chart 1. Value of irradiation in carcinoma of the breast. (After Pfahler.)

By invitation, the following men have served:

Frank J. Anderson	R. G. Allison
G. T. Nordin	W. H. Ude
C. R. Drake	R. H. Morse
A. S. Fleming	C. D. Harrington

Three sub-committees, including all members of the committee but with individual chairmen, were organized.

Dr. Ivar Sivertsen, as chairman of the first sub-committee, had direction of the survey of the incidence of cancer.

Dr. Martin Nordland, as chairman of the second sub-committee, made a survey of the radium facilities at our disposal.

Dr. A. A. Zierold, as chairman of the third sub-committee, made a survey of the x-ray facilities.

Altogether, seven meetings were held and reports and advice were received from Drs. Allison, Morse, Nordin and Ude from the standpoint of the x-ray, and Drs. Drake, Fleming and Peyton from the standpoint of

radium therapy. Everyone on the committee made his contribution and accepted the task imposed upon him.

As a whole, the committee has made a study of the cancer problem in Minneapolis as to the number of deaths reported annually from cancer in Hennepin County, the number and type of cancer cases treated in the private and charity hospitals in Minneapolis and the available x-ray and radium equipment for the treatment of cancer in Minneapolis. The recent report of the American Society for the Control of Cancer indicates satisfactory x-ray and radium equipment at the Cancer Institute at the University. The Cancer Committee has, therefore, devoted its time to a study of the cancer situation and its relation particularly to the private hospitals in Minneapolis.

I also am indebted to Dr. G. E. Pfahler, who furnished me with reprints of one of his articles, "Results of Radiation Therapy in 1,022 Private Cases of Carcinoma of Breast from 1902 to 1928." This deals largely

with results of x-ray therapy, and the work is old enough to permit of reduction to statistics. He considers experience with combined radium and x-ray too limited and too recent to be considered in detail. He states: "It seems to me that good results are practically doubled if a patient received thorough and skillful postoperative treatment." With his permission, I present one of his charts which substantiates this statement in regard to breast cancer.

The committee feels that it has made a beginning, but that there remain many problems. The greatest of these is a uniform way of reporting all cases and an adequate follow-up system. This may be provided for by the further work of this or some other similar committee. However, the first task was that of inventory and the present report is limited to that. I will now call upon Dr. Ivar Sivertsen for the survey of cancer cases occurring in private practice.

SURVEY OF INCIDENCE OF CANCER— MINNEAPOLIS HOSPITALS 1933

DR. SIVERTSEN: It is generally agreed that cancer is still on the increase, notwithstanding the educational efforts being made to inform the public concerning its ravages. By looking over the records of the local health office covering the period from 1920 to 1932, inclusive, we find a definite increase in cancer deaths as follows:

Year	Deaths
1920	445
1925	550
1930	739
1932	729

Whereas in the case of tuberculosis, one finds a definite decrease as follows:

Year	Deaths
1920	352
1925	214
1930	143
1932	105

The value of education seems to have been demonstrated in the case of tuberculosis.

In the year 1920, 5,176 deaths were recorded in Minneapolis among a population of 489,400. Cancer accounts for 14.5 per cent of the deaths.

In the year 1920, 4,714 deaths were recorded in Minneapolis among a population of 380,582. Cancer accounts for 44.5 or 9.4 per cent.

Dr. F. G. Gade of Oslo, Norway, gives some interesting statistics in a little book on cancerous diseases. He attempts to answer the question—Is Cancer on the Increase? He shows that, according to the figures of John K. Gore, comparing the periods 1901 to 1905 with 1921 to 1925, there is a definite increase in cancer death rate in all countries except one (France showed a decrease of 27.7 per cent). Time does not permit the mention of all,—it will suffice to note that Austria showed an increase of 68 per cent; England and Wales an increase of 47.1 per cent; and the United States an increase of 30.9 per cent.

These figures are comparable with those disclosed by our local health office. There is a definite increase in the cancer death rate. I, for one, do not believe that this increase is altogether due to improved diagnoses or increased longevity. There are other factors which we, as yet, do not understand.

In an effort to determine the number of cancer cases treated by the hospitals in the city during 1933, reports from the hospitals were tabulated and examined. Although this may not be an exact picture, it should indi-

cate the trend of affairs. We find that 999 cases were reported as treated in the various hospitals of the city. This figure includes 172 from the Minneapolis General and 114 cases from Hennepin County treated at the Minnesota General Hospital. In other words, 703 cases were treated during 1933 at the private hospitals, or approximately 70 per cent of the total.

This study has as its object not only to help the physician in his care of these cases but also to inform the public that the medical profession of our city is able and willing to care for cancer cases and is interested in their care.

This report would become much too lengthy if I should go into any great detail. A few figures might be of interest. Of the total 729 deaths in 1932, we find 51 per cent were males, 49 per cent females. These figures conform with most records consulted by the writer. As to age incidence, two deaths occurred in the first year of life; four between two and five; three between five and nine; and one between ten and fourteen. The oldest ages recorded were ninety to ninety-four years. The greatest number of deaths (337 deaths) were recorded in the sixty to seventy-five year period. The records do not disclose whether sarcoma or carcinoma caused death in the early years of life.

Deaths according to organs involved showed: Breast, 184; stomach, 110; intestine, colon, sigmoid, rectum and anus, 134; prostate and bladder, 112; cervix, 97; body of uterus, 35. Possibly the greatest surprise came when we noted that cancer of the pancreas caused twenty-five deaths.

All portions of the body were represented and it is of interest to note there were twenty-five deaths from cancer of the larynx, pleura and bronchi. This would seem to show an increase in the types of cancer.

It is likewise interesting to note that in considering the age incidence in relation to sex, we found the greatest number of deaths among females in the 60 to 64 age group, while in males it appeared in the 70 to 74 age group, or ten years later. This bears out the statement by Dr. Dahlstrom and the writer that muscular activity has a bearing on the incidence of cancer.

How soon after discovery of tumor or suspicious symptoms did they seek medical advice? In looking over the hospital reports for 1933, one finds the first consultation after the appearance of the first symptoms ranged from one month to twenty years, many being several years. One male patient, aged sixty-three, a bladder case, stated he had had symptoms for forty years. We found several with bladder and prostatic disease who had been troubled for several years prior to seeking medical advice. In stomach cases, the elapsed time ranged from a few weeks to two years. In breast cases it was noted that consultation was often immediately after discovery of the lump and ranged from one day to several weeks. Again, a few waited months. It would seem that the prostatic patient is prone to wait longer than the others before consulting his physician. It seems that publicity would be of value in shortening the period in this type of disease. One hospital reported:

Stomach, 5 weeks to 3 years (most 2 to 5 months); sigmoid, 5 days to 4 months (most 5 days to 5 weeks); uterus, 2 weeks to 2 years (most 6 months); breast, 3 days to 1 year (most 2 to 6 months); cervix, 3 weeks to 3 years (most 3 to 9 months).

In general, it may be stated that the average patient does not seek advice until the symptoms are so pronounced that "He who runs may read."

In the January issue of the *Hennepin County Medical Society Bulletin*, in a notice designated "Truths for the Public," by Dr. W. A. O'Brien, relative to the value of forming public opinion, it was stated that 6 per cent of cancer cases in Minnesota were treated at the Minnesota General Hospital, and 8 per cent at the Mayo Clinic, leaving 86 per cent treated by private physicians and smaller groups. If this is true there is plenty of work for all of us to do.

CONCLUSIONS

1. From a superficial survey of the Minneapolis Hospitals' experience for 1933, approximately 1,000 cases of cancer are treated annually, private physicians handling about 70 per cent of these cases.

2. The Committee on the Study of Cancer from the Minneapolis Surgical Society feels that a certain amount of information should be given the public at large relative to cancer and cancer treatment; that the various recognized hospitals of the city are well prepared and willing to assist in the treatment of cancer by means of surgery, x-ray and radium.

3. A study of the statistics from the Minneapolis Health Department discloses a definite increase in the number of deaths from cancer over various yearly periods.

The Minneapolis Surgical Society is definitely interested in supporting and encouraging any movement which would inform, advise and encourage cancer patients to seek medical and surgical advice at the earliest possible moment; in this way to obtain the greatest hope for a cure, and thereby decrease the incidence, morbidity and mortality from cancer.

Finally, the Committee extends its appreciation to the various hospitals and staffs for their coöperation and courtesy in forwarding the reports for this study, and to Dr. F. E. Harrington and his staff at the Health Department for their coöperation and assistance.

SUMMARY OF MINNEAPOLIS HOSPITAL CANCER EXPERIENCE, 1933

Carcinoma—General carcinomatosis.....	19
Breast	184
Bronchi, lungs, larynx, pleura.....	25
Face	80
Gall-bladder—bile ducts.....	22
Liver	25
Stomach	110
Intestine	8
Colon	33
Sigmoid, rectum, anus.....	93
Pancreas	25
Esophagus	14
Pharynx	2
Tongue and mouth.....	22
Jaw	9
Glands	12
Bones	10
Spine	12
Brain	7
Ovary	26
Cervix	97
Uterus	36
Vagina and external genitals.....	8
Pelvis	1
Prostate	71
Testes and external genitals.....	13
Kidney	12
Bladder	41
Skin	24
Undetermined	4
Sarcomata	12
Thyroid	1

DR. J. FRANK CORBETT: In the treatment of cancer in the private hospitals by the members of this Society, it is not intended to present for discussion the treatment of the various types of cancer as it occurs in the operating room, but it is our purpose to survey the various types of accessory equipment indicated and required for the proper treatment of cancer in this community. With that purpose in view I will next call upon Dr. Arthur Zierold, Chairman of Sub-Committee on X-ray Therapy.

REPORT ON X-RAY THERAPY AS AN ADJUNCT TO SURGERY

DR. A. A. ZIEROLD: Cancer, for a great many years, has been known and recognized and for a great many years surgeons have treated it. It is probable that they will continue to do so for many years to come, as the problem of treatment is primarily a surgical one. It must be remembered that whenever cancer, in its primary form, can be totally excised, it can be cured and

that the result obtained is more often determined by the state of the patient when first seen than by the nature of the operation. It is only when cancer is neglected and so widespread as to demand too great a sacrifice of substance or when it invades areas which are surgically inaccessible that the surgeon must look for other agents to attain success.

The discovery of x-ray and the isolation of radium have made available a new form of therapy. Early in its history it was found that electro-magnetic radiations of short wave length were noxious to certain tissue cells, particularly those of malignant origin. For a short time this knowledge was a two-edged sword, but painful experience developed such control of this agency that extensive and hitherto untreated areas of malignancy can be successfully attacked. At the present time radiation therapy has progressed to such a point that not only has the field and scope of surgery been greatly enlarged and the operation itself made more effective and safe, but a new and exclusive field for radiation therapy itself has been developed.

As opposed to radium with its very short gamma rays and low energy output effective over relatively short distances, x-ray machines in common use produce radiation of considerably greater wave length, and, likewise, greater energy, making them effective for greater distances. As the intensity of radiation varies inversely as a square of the distance through which it acts, and as the wave length of the radiations produced varies inversely as the voltage, it has seemed that a more desirable agent would result in combining these factors. Consequently, there have been built in recent years several x-ray machines of high voltage, ranging from 400,000 to 900,000 volts. Of these, there are six in this country, two in Germany, one in France, and two in England. While such machines more nearly approximate the ideal of radiation therapy, those producing 200,000 volts are adequate if properly used. The American Society for Control of Cancer, in its effort to standardize therapy equipment and after careful investigation of its various forms, concluded that any equipment producing 200,000 volts was ample in strength and flexibility.

We have, in Minneapolis, available for treatment of private patients, five such deep therapy units in the charge of men trained in their use. Not only is this physical equipment and personnel sufficient to provide proper and adequate radiation treatment, but they are of such number and so disposed that the treatment is well within the means of the average patient.

In recent years the idea has gained ground that cancer is an institutional disease, that it can be treated only in hospitals devoted solely to this purpose and that such institutions are peculiar and unique combinations of men and material. This is probably true in only a limited sense. The development and progress of radiation therapy is well within the memory of most of us and, because it is a new branch of medical science, knowledge concerning it is not widely disseminated. To acquaint ourselves with the present status of x-ray therapy and its recent developments and to satisfy ourselves with regard to the extent and availability of this form of treatment, we have gathered together with us this evening the men responsible and directing this form of treatment in several of the various hospitals of Minneapolis and it is our privilege and pleasure to share with you the results of their experience. I take great pleasure in introducing Dr. Russell Morse.

RADIO-SENSITIVE TUMORS

DR. RUSSELL MORSE: The various species of cells which constitute the body exhibit a different sensitivity to the effects of radiation, whether x-ray or radium. A tumor arising from a certain type of cell will, as a rule, show a sensitivity similar to that of the parent cell.

Those tumors are truly radio-sensitive and may be made to disappear by doses of radiation which produce no demonstrable change in the surrounding and overlying normal tissues.

Very few malignant conditions can be classified as radio-sensitive under the strict use of the term, and they are the myelogenous and lymphocytic leukemias, the lymphoblastomas (whether Hodgkin's disease or lymphosarcoma), the lymphoid type of thymoma, the lymphoepitheliomas of the nasopharynx, and the metastases from embryonic carcinoma of the testicle.

In the treatment of these conditions the distribution and the dosage of radiation depend upon the type of tumor and upon whether it is a local or generalized malignancy.

The thymomas, lymphoepitheliomas, and the metastases from embryonic carcinoma of the testicle should be treated up to the limit of safety at the first course of treatment in the hope of destroying all of the malignant cells.

Occasionally, after a careful search of the body, a lymphoblastoma appears to be limited to a single tumor which may involve one node or a localized group of nodes. This tumor should be treated adequately at the first course of treatment with the hope, usually false, that the malignancy will not make its appearance in other regions of the body.

Most lymphoblastomas are very early a disseminated malignancy and, although the tumor masses can be repeatedly "melted away" by radiation, experience has shown that there is a persistent tendency to recurrence and to the development of new tumors.

Myelomas and lymphocytic leukemias are also to be considered as a malignant process which is widely disseminated throughout the body. The acute lymphatic leukemias usually yield rapidly to radiation of the spleen and bone marrow but the results are only temporary. The chronic lymphocytic leukemias and myelogenous leukemias can be kept under control, sometimes for surprisingly long periods of time, by the use of small amount of radiation of the spleen. Occasionally, however, it is necessary to radiate also the bone marrow in order to secure a satisfactory reduction in the number of leukocytes in the blood and to secure relief of symptoms.

From our present knowledge we believe it is a mistake to treat generalized lymphoblastomas and the leukemias with massive doses of radiation. Our first consideration should be the general health of the patient. We must remember that we are treating an anemic patient with a force which tends to make him more anemic. We should watch the general health of the patient and proceed with the smallest amount of radiation that is necessary to control the disease.

The invariable fatal outcome of the lymphoblastomas and the leukemias should not obscure the really brilliant results we can obtain in preserving the relative good health and activity of the individual afflicted with these conditions. We probably do not even yet know whether we are contributing to a longer life, but we do know that the individual can be kept active and working to within a short time of his death.

Due to the marked sensitivity of the lymphoblastomas and leukemias to radiation, satisfactory results can be obtained by the use of x-rays generated from 135 to 150,000 volts and filtered through 4 to 6 mm. of aluminum. For this reason these malignant conditions can be treated satisfactorily in localities where a machine capable of generating 200,000 volts is not obtainable.

Lymphoblastomas involving the root of the lung may simulate closely a primary bronchogenic carcinoma, both in the appearance of the tumor mass and production of atelectasis. It is well to keep this in mind because radiation will assist in the differential diagnosis and may alleviate a serious condition which might mistakenly be considered hopeless.

DR. A. A. ZIEROLD: Due to the confusion that invariably attends the assembling of such a program as

this, some mistakes of editing have occurred. The name of Dr. Frank Anderson of Deaconess Hospital has been omitted from this program. Dr. Anderson is the roentgenologist at the Norwegian Deaconess Hospital and has had a considerable experience with deep therapy. I should like this opportunity of asking Dr. Anderson to discuss with you his experience and his estimate of this form of treatment. Dr. Anderson.

DR. FRANK J. ANDERSON: At the Deaconess Hospital we have a machine which is limited to an output of 180,000 volts. This is not considered sufficient for deep therapy and we have not used it in deep seated cancers but we have used it in the treatment of leukemias, Hodgkin's disease, tuberculous lymph nodes, and following amputation in breast carcinomas. During the past twelve years that I have been at this hospital we have had fairly good results in the treatment of the above mentioned conditions. We have not felt that, to date, we have had a sufficient amount of work at our hospital to warrant installing the larger type of machine but may in the comparatively near future.

DR. A. A. ZIEROLD: Dr. Walter Ude has for some years directed the Department of Roentgenology at Eitel Hospital. He has at his disposal one of the high voltage equipments and has had opportunity to treat and observe a variety of malignant diseases. I take great pleasure in presenting Dr. Ude, who will speak to you concerning Roentgen Irradiation of Metastatic Malignancy.

ROENTGEN IRRADIATION OF METASTATIC MALIGNANCY

DR. WALTER H. UDE: The invitation to appear on this program was extended to me as the roentgenologist of Eitel Hospital. This hospital is one of four voluntary hospitals of Minneapolis who are fully equipped to administer deep roentgen irradiation. It may be of interest to you to know that these four therapy equipments are in actual operation for only a few hours daily, and that their capacity is such that they could take care of from four to six times the amount of work done at the present time. Facilities are therefore available for a marked increase in the amount of x-ray therapy.

The use of x-ray therapy has been gradually extended to include a large variety of conditions of both benign and malignant nature. It is probable that our most satisfactory results are in benign conditions, where a definite objective is usually attained, since these cases are practically all carefully selected. During the past year, 23 per cent of our deep therapy at Eitel Hospital was given for non-malignant conditions, 12 per cent for lymphogranulomata, and 65 per cent for malignant tumors. Carcinoma of the breast, mainly postoperative, accounted for 30 per cent of the entire group, or 45 per cent of the malignancies.

In the treatment of metastatic malignancy, roentgen therapy plays a most important and beneficial part. In many instances it is able to completely destroy skeletal metastases, allowing regeneration of the involved bone and complete restoration of function. In other instances, it may arrest the process sufficiently long to prevent invalidism until metastases to other vital structures lead to a rapid termination of the disease. It may destroy glandular masses to such a degree as to give complete relief from pressure on adjacent organs. In almost all cases it will bring relief from pain.

Metastatic malignancy may be conveniently considered under the following subdivisions: (1) glandular metastases; (2) pulmonary and pleural metastases; (3) liver metastases; (4) brain metastases; and (5) bone metastases. The regional lymph nodes present the first line of defense of the body against the migration of malignant cells, and are therefore the most frequent site of transplants. It is common practice to remove such glands surgically as completely as possible. This should be followed by intensive irradiation in an attempt

to destroy any residual tumor tissue, or to confine it to the involved gland by a firm fibrosis. Where such glands are not resectable, they may often be markedly influenced by irradiation. This is especially marked in the case of metastases from embryonal tumors of the testis, or tumors of similar highly malignant type. Large glandular masses in the retroperitoneal areas can thus be made to completely disappear under intensive therapy. Other more resistant metastases, however, may be influenced very little by such treatment.

Pulmonary and pleural metastases are usually discovered following development of a persistent dry cough, or of signs of pleural effusion. A roentgenogram will usually establish the diagnosis. Pleural fluid should be drained before radiation therapy is administered. The lungs are then treated by direct cross-firing. Temporary benefit usually results in most cases, and in some there may be marked regression of the process.

Metastases to the liver are rarely, if ever, subjected to radiation therapy. They show little, if any, response, and the systemic reaction is so severe that it prohibits this form of treatment.

The clinical diagnosis of involvement of the brain by metastases is based on the development of symptoms of increased intracranial pressure or neurologic signs of localized brain involvement. In a high percentage of cases with brain involvement, this occurs in the terminal stages of the disease. Nevertheless, x-ray therapy may successfully control troublesome symptoms such as headache, vomiting, Jacksonian convulsions, diplopia, and paralysis of cranial nerves. It may thus add greatly to the comfort of the patient and reduce the administration of narcotics. As a palliative measure it may therefore be of great value.

Metastases to bone constitute a most interesting field for radiation therapy. Pain is usually the first symptom of bone involvement, and this is localized at the site of the metastases, but may follow the distribution of adjacent nerves. Occasionally, bony tenderness on direct pressure or percussion may be the earliest finding. When such metastases produce symptoms, they are almost always demonstrable roentgenographically. Rarely is a lesion demonstrated which does not produce symptoms. In a few cases pain may precede the roentgenologic evidence of metastases by several months.

There is considerable variation in the response of bone metastases to radiation therapy. Of the destructive types of metastases, that of hypernephroma is one of the most resistant to irradiation, as is also that of carcinoma of the bladder. The sclerosing or osteoblastic types of metastases of carcinoma of the prostate show practically no structural response to irradiation. It, however, often gives relief from pain and aching. Metastases from carcinoma of the cervix, and from the mouth, tongue and lip, may also show rather indifferent response to treatment. Metastases from carcinoma of the breast yield most favorably to irradiation. Relief of pain results within a few days after the first treatment, and most cases show progressive improvement. There is cessation of the destruction, and usually repair by firm new bone formation with complete restoration of function. In a number of cases, sclerosis follows x-ray therapy, so that the end-result resembles the osteoblastic type. Where the metastasis is osteoblastic in character before therapy, irradiation produces increased sclerosis. The clinical improvement is at times most striking. These patients are often restored to a normal life for a period of many months or even several years. Within a few weeks time they may be transformed from almost complete invalidism to a condition where they can temporarily resume their usual activities.

It is in these responsive cases where radiation therapy receives some of its greatest encouragement. The radiotherapist must, of necessity, be an optimist. He must be able to see a ray of hope even in the most

severe cases, and consider it well worth the effort to produce relief of symptoms and add a few months of relative comfort to a patient's life, even when at times he knows that the outcome is not in doubt. This is one of his most important services to the cancer patient.

DR. A. A. ZIEROLD: While the time at our disposal this evening does not permit of extended discussion of the various types of malignant diseases, nevertheless, Dr. G. T. Nordin has prepared a brief account of his experience at the Swedish Hospital in the treatment of uterine and prostatic malignancy. As I previously mentioned, Dr. Nordin is the Roentgenologist at the Swedish Hospital and has at his disposal apparatus developing 200,000 volts. I take great pleasure in presenting to you this evening, Dr. G. T. Nordin.

RADIATION THERAPY IN UTERINE AND PROSTATIC MALIGNANCY

DR. G. T. NORDIN: Radiation therapy is only one of the methods at hand for the treatment of malignancy of the cervix uteri. I do feel, however, that it is one of the most important methods, particularly as far as the cervix is concerned.

As early as 1924 Dr. A. W. Crane of Kalamazoo, Michigan, made the prediction that within ten years the problem of cancer of the cervix would be turned over to the radiologist. As you all know, his prediction came true long before the ten years were up. The treatment of malignancy by x-ray is usually spoken of as "deep x-ray therapy." This, I think, is a misnomer, and should be designated as "high voltage therapy," meaning a voltage of not less than 200,000 volts. It is not only necessary that we have the required equipment to work with but it is also necessary that we know where and how to use it, and that we see to it that the patient, as well as the radiologic technician, is protected from stray radiation.

The same degree of skill is necessary on the part of the radiologist as that required of a successful surgeon. Errors in judgment on the part of the radiologist may produce serious results the same as in surgery. It is not only necessary that we know how much x-ray radiation to give the lesion but we should also look after the general welfare of the patient. By this I mean that the treatment room must be well ventilated, so as to reduce the amount of liberated ozone in the room to a minimum, otherwise the patient is going to complain of the so-called "radiation sickness." I have found that if the patients are given plenty of water and fruit juices they feel much better. A mild sedative given previous to each treatment also aids considerably in avoiding "radiation sickness."

When I first began to treat malignancy with high voltage x-rays, I gave the entire erythema dose in one treatment, and the patients became very ill. Later, I gave them only one-third of an erythema dose for four days, repeating a similar series from the opposite side. In this way the patients do not become ill during the treatment, and it is my opinion that this way of treating them is more effective than the former.

The type of filter used is of importance. If too thick a filter is used, much of the effective radiation is lost. This increases the time, the discomfort of the patient, and the wear and tear of equipment. Lately I have used the composite filter, containing sheets of tin, copper, and aluminum. This type of filter absorbs all of the soft radiation, and leaves most of the effective radiation intact. The usual distance of the x-ray tube from the skin of the patient is about fifty centimeters, unless for some reason this is impracticable. The percentage increase in deep radiation where a greater focal-skin distance is used, is so slight that it is almost negligible and the time is very much longer.

It is almost impossible to consider radiation therapy of malignancy of the uterus without including radium.

have a chart showing diagrammatically the distribution of the two energies in the pelvis of the treated individual. You will notice that the two energies complement one another very well. One obtains the maximum amount of radiation at the site of the tumor without endangering the surrounding structures, as the bladder and the rectum, and yet enough radiation to the preaxial region to be effective. The amount of radium to be used depends upon the size of the patient and the size of the tumor. The larger the patient and the larger the size of the mass of the tumor, the larger the dose. This may vary from 1,000 to 4,000 milligram hours of heavily filtered radium. I am not going into the details of the applications of this energy, as this, I understand, will be covered in another paper.

It is very important that the maximum amount of radiation be given the first time the patient is treated, because the malignant cells, at this time, are usually more sensitive to radiation than they will be later on. It is, therefore, very evident that the success of the radiation treatment depends to a great extent upon the first radiation dose. We must naturally guard ourselves against giving too much so as to do irreparable damage to the surrounding structures. It is almost as hard to give too little, because the growth of the cells would be attenuated for only a short time, and they would grow even faster later on.

When one examines the patient two months after a complete radiation of this kind, one is often very much surprised at the complete disappearance of the tumor mass and the normal appearance and feel of the structures. Although it seems that all of the malignancy has been disposed of, if these tissues were carefully examined microscopically, one would find nests of cancer cells surrounded by connective tissue. If the surgeon would step in at this time to clean out what was left from the radiation treatment and prevent the reactivation and the further spread of these cells, we would be doing more for our patients. The closest cooperation between the surgeon and the radiologist is found to produce the best results, and until then we are going to get nowhere with the cancer problem.

The problem, so far as cancer of the prostate is concerned, is considerably easier, because of the fact that the gland lies much closer to the surface, both to the anterior and to the perineal surface. In these cases I give one erythema dose from the front, the back, and the perineum. In this way I can deliver about a hundred and fifteen per cent of an erythema dose to the prostatic region. It has been very gratifying to note the relief that the patients receive from the x-ray treatment. Most of these patients come in because of pain and retention, and, many times, before the patient finishes the series the pain has been relieved and the retention has been markedly lessened. To be sure, many of the patients complain of almost complete obstruction during the course of the treatment and have to be catheterized. This, however, does not last very long because shortly the size of the gland begins to diminish and the patient is able to pass his urine. Occasionally one finds a very radio-sensitive carcinoma of the prostate that literally melts away. I am sorry to say that this is the exception rather than the rule.

The patients I have taken care of during the past ten or twelve years have been operated upon after the first or second series of x-ray treatment, the operation consisting of the removal of sufficient amount of tissue along the course of the urethra to completely relieve any tendency toward obstruction. During the last year or two this operation has been done by means of the endotherm-knife or the endotherm-loop. During the past year we have tried to insert radium by catheter into the prostatic portion of the urethra following a course of high voltage therapy. As far as we can tell at the present time, this, apparently, is going to work out well, although sufficient time has not elapsed to express a definite opinion. The value of high voltage

therapy in metastasis from the prostate is well known; however, this will be covered in another paper.

DR. A. A. ZIEROLD: In every community there are some few individuals who require no introduction. There is little that I can tell you concerning the next speaker which you do not already know. Dr. Allison has, for a number of years, concerned himself not only with the broad field of roentgenology but with the more specialized field of deep therapy. I am sure that from the breadth of his experience his remarks this evening should prove interesting and valuable. I take great pleasure in introducing Dr. R. G. Allison, who will speak to you concerning "Radiation Treatment in Carcinoma of the Breast."

RADIATION TREATMENT IN CARCINOMA OF THE BREAST

DR. R. G. ALLISON: The radiation treatment which is being employed at present in this locality in carcinoma of the breast consists primarily of postoperative radiation. Our routine at present is as follows:

The patient is referred to us by the surgeon shortly after the breast amputation has been done. If possible, we start our treatments about ten days after the amputation has occurred. Radiation given at this time has no deterrent effect on the healing of the wound. Our treatment consists of x-ray applied over three fields and is usually completed within four or five days. The factors which we use are: 200 K.V.—30 Ma. at 50 cm. distance and with $\frac{3}{4}$ mm. copper and 3 mm. aluminum filter. An erythema dose can be given over each area at this setting in fifteen minutes.

As I have said, the greater part of our therapy is postoperative therapy. The fact that this is administered postoperatively is not by our choice. We rarely see a patient with carcinoma of the breast before operation. This is, I think, due mainly to the attitude of the surgeons who feel that any time elapsing between diagnosis and the operation in cases of carcinoma of the breast is time wasted or worse. They have this feeling because they believe that delay will simply be time in which metastasis may occur. This feeling is perfectly natural and is based on a lack of knowledge of what can be accomplished by radiation. Frequently, also, I believe we see patients after operation who are sent to us because the surgeon feels that radiation will do no harm and may possibly do some good. In other words, postoperative radiation is often given merely to assure the patient that everything is being done.

There is no dispute that radiation has a known and proven value in carcinoma in locations other than in the breast, notably the cervix of the uterus. There are still those who maintain that radiation is of no proven value in carcinoma of the breast. However, we have all seen these same individuals refer inoperable or recurrent cases of carcinoma of the breast for radiation and invariably they admit that such cases are benefited by the radiation.

Dr. Bloodgood, in a recent publication, tells of his experience with a patient suffering from carcinoma of the breast. The patient was suffering from an apparently inoperable carcinoma of the right breast with advanced involvement of the breast but without palpable axillary glands. There were no demonstrable metastases. The patient, sixty-five years of age, was feeble, and a poor operative risk. Radiation was administered and nothing else was done for a period of three months thereafter. The general condition of the patient was not affected by the radiation. At the end of the three months Dr. Bloodgood performed, with the electric cautery, a chest-wall excision of the breast, the lower portion of the pectoralis major and a large area of skin. The periphery of the tissues removed showed no evidence of carcinoma grossly and since no glands were palpable in the axilla a radical operation was not performed. More than a year has elapsed

since the operation and the patient is still living with no evidence of carcinoma and is as well as she was preceding the x-ray and surgical procedures. The tissues removed at the operation, when studied microscopically, were very illuminating. In that portion of the tumor which had received the greatest amount of radiation a new type of connective tissue was discovered. This connective tissue differed from normal breast structure and also showed no evidence of carcinoma. In the area surrounding this zone numerous cancer cells were found. These cancer cells were only distinguishable by their outlines, as the cellular structure took no stain. In the tissue which had received the smallest amount of radiation nests of cancer cells were discovered. These cancer cells differed in no particular from those in cancer of the breast that had not been exposed to radiation. This case demonstrates very definitely the value of radiation. To my knowledge this case is the only one in which tissues have been obtained at such a length of time following gradation. In the average case which is treated preoperatively, a radical resection is done about ten days following the treatment. This length of time is insufficient to allow for structural changes to occur in the tumor and the morphological characteristics of the cancer cells have not been sufficiently changed to allow conclusions to be drawn.

Carcinoma of the breast, no matter what type of treatment it receives, presents a gloomy picture. Statistics on this subject vary widely, but large numbers of series of such cases show that when treated by operation alone about 70 per cent of all patients coming to operation die within five years. The majority of the remaining 30 per cent die ultimately from cancer.

Dr. Portmann of the Cleveland Clinic has recently presented a series of cases, consisting of 103 consecutive cases in which operation and radiation were combined in treatment. He divided his cases into three major groups as follows:

Group I—Cases in which the tumor was limited strictly to the breast and the patients were free from involvement of the axilla as reported by the pathologist.

Group II—Cases with axillary and slight skin involvement, but with the tumors still movable.

Group III—Cases more advanced but still considered by the surgeon to be operable.

In his series in Group I, 77.6 per cent of the patients were free from cancer at the end of five years. In Group II, 61 per cent lived for five or more years and 56.3 per cent were free from cancer at the end of five years. However, of those in Group III, 84.4 per cent died of cancer and only 18.7 per cent lived for five years. When all cases are considered as one group he found that 50.5 per cent lived five years or more and that 42.7 per cent were free from disease for five years or more.

Cases of carcinoma of the breast treated by radiation alone are as yet not numerous. However, numerous cases are on record of inoperable carcinoma of the breast which has been treated by radiation alone with good results. To date, little of value has been published regarding such cases. This is true because practically all such cases have been treated and observed without biopsy. Without biopsy such a case is of no value for statistical purposes. Individual experience has shown, however, that treatment of carcinoma of the breast by radiation alone is of distinct value.

A recent bulletin from the New York State Institute for The Study of Malignant Diseases states, "Radiation and conservative operation were also practiced *** with some astonishing results *** and with marked improvement in the lesions. Noteworthy was the effect in two women who were pregnant and had large malignant tumors in their breasts which completely disappeared by this method of treatment."

Dr. Douglas Quick of New York has followed an operable carcinoma of the breast treated by radiation alone, for well over fourteen years. In this patient the

tumor was 2.5x3.5 cm. in diameter and there was a questionable node in the axilla. The tumor regressed rapidly at first and then more slowly. After three years there was a dense residual mass in the breast and telangiectasis of the overlying skin. The condition has not changed since that time.

The majority of authorities feel that biopsy can safely follow intensive radiation after an interval of two weeks. With this knowledge available it should only be a short time until statistics on the value of treatment by radiation alone will have reached a stage at which conclusions may be drawn as to the relative merits of the various types of treatment.

With the realization that treatment of carcinoma of the breast is as yet far from satisfactory it seems that every effort should be extended towards improving the results obtainable. Knowing the value of radiation in carcinoma in general it seems only logical that pre-operative as well as post-operative radiation should be a routine in the treatment of carcinoma of the breast. Such treatment slows growth in the primary tumor and brings about a regressive and degenerative effect on the tumor bed as well as on the tumor cell. A certain number of deaths following operation are due to dissemination of the tumor cells at the time of the operation. Postoperative radiation does not get at these cells because they are outside the field of radiation. Pre-operative radiation will reduce this type of dissemination. Operation should be deferred until six or eight weeks after the pre-operative radiation is completed. Pre-operative radiation must be by means of x-ray. The application of radium is impractical and the implantation of radium is contra-indicated. It must be remembered that inoperable carcinoma of the breast cannot be rendered operable by radiation. The more spectacular the regression, the more malignant the tumor and, hence, the more dangerous is surgery.

(To be continued)

PHENOLPHTHALEIN AS A "PATENT MEDICINE"

Phenolphthalein was introduced into medicine as a laxative about thirty years ago, following the observation that certain of the cheaper Hungarian wines to which it had been added took on an actively laxative effect. Phenolphthalein is an odorless and almost tasteless powder, very slightly soluble in water. From the fact that it is nearly tasteless and is active in small doses, it is especially well adapted for the production of what have been called candy medicaments. Among its disadvantages is a degree of variability in action, small doses sometimes acting excessively, when at other times a larger dose will fail to act. It may cause, in addition to purgation, colic, rapid pulse, difficult breathing, and even collapse. There may be no serious objection to a physician's prescribing phenolphthalein in candy form for a child, because the very conditions that surround the issuance and the use of a prescription are such as to make it highly improbable that the dosage recommended will be exceeded. It is an entirely different thing, however, to put up an active drug in the enticing form of candy or chewing gum, sell it indiscriminately to the public for self-medication, and advertise it in newspapers and over the radio by the ballyhoo methods common to "patent medicine" exploiters. It is a well-known fact that the public has a general idea that products sold as "patent medicines" are, broadly speaking, harmless. They have a feeling that the state would not permit the indiscriminate sale to the public of drugs that were really dangerous. How far this is from the truth, every physician knows, but the fallacy persists. The fact is, there is no legitimate excuse for putting up potent drugs in the enticing form of confections and selling them indiscriminately to the public.—(*Jour. A. M. A.*, April 29, 1933, p. 1358.)

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

Books Received for Review

SURGERY OF A GENERAL PRACTICE. A. E. Hertzler, M.D., Chief Surgeon, Halstead Hospital, and Victor E. Chesky, M.D., Chief Resident Surgeon, Halstead Hospital. 602 pages. Illus. Price, cloth, \$10.00. Saint Louis: C. V. Mosby Company, 1934.

SPINAL ANESTHESIA. George Rudolph Vehrs, M.D., of Salem, Oregon. 269 pages. Illus. Price: cloth, \$5.50. Saint Louis: C. V. Mosby Company, 1934.

MODERN DRUG ENCYCLOPEDIA AND THERAPEUTIC GUIDE. Jacob Gutman, M.D., Phar.D., F.A.C.P. 1393 pages. Price \$7.50. New York: Paul B. Hoeber, 1934.

This is an index of a large number of non-pharmacopeal, medicinal preparations, drugs, chemicals, biologicals, foods, mineral waters, allergens and miscellaneous products. These substances are listed together with the manufacturer's name, and under each is given a brief description, its action, uses, sources and method of administration. A bibliography is supplied and an extensive index. The book is of value for reference purposes.

T. A. PEPPARD, M.D.

DISEASES OF THE SKIN. 4th edition. Oliver S. Ormsby, M.D., 1288 pages. Illus. Price \$11.50. Philadelphia: Lea and Febiger, 1934.

The fourth edition of Dr. Ormsby's well known book is, as usual, an improvement upon its predecessors. Thirty-six new diseases have been added and, as a result, it is almost impossible to find any skin disease that is not mentioned. This is a valuable asset.

The illustrations are numerous and good. The book is very well written and is of the utmost value to anyone interested in dermatology.

The bibliography is especially fine and will be a great help to anyone wishing to look up the literature on any cutaneous disease, as the key articles are all given and

This is an excellent book and can be recommended.

S. E. SWEITZER, M.D.

DIET IN SINUS INFECTIONS AND COLDS. Egon V. Ullmann, M.D. 166 pages. Illus. Price, \$2.00. New York: The MacMillan Co., 1933.

The subject of diet in sinus infections is a timely one and Dr. Egon V. Ullmann has given us a book of real value in his treatise on this subject. I would recommend this book as worthy of study not only by specialists in eye, ear, nose and throat, but by all physicians as well.

A few of the points to which he calls attention are the following:

Every other person believes he suffers from sinus trouble. Many of these sufferers are not primarily sick in the nasal sinuses but the nasal mucous membrane simply represents the location where abnormal reactions manifest themselves. Effects which various foods

have on the system are discussed; also the effect where the diet is principally meat alone or fruits or vegetables alone. The need of salt-free diet in some cases is also brought out as well as the need of alkaline producing foods in others.

All patients with colds and sinus infection show signs of marked acidosis, such as shortness of breath and inability to hold their breath after deep inspiration longer than twenty to twenty-five seconds.

With increased acidity the breathing becomes faster from the carbonic acid in the blood acting on the respiratory center. In directing the method of living and diet of these patients, most of them can be kept free from colds.

Wrong food given with an abundance of vitamins will lead to chronic diseases. Meat broth has stimulating effect on the nervous system with practically no food value.

Citrus fruits with acid taste have alkaline effect in the body; meats and bread, with neutral taste, have an acid effect.

Food alone will not bring about a cure if not aided by general hygiene.

ELWYN R. BRAY, M.D.

MENTAL HYGIENE IN THE COMMUNITY. Clara Bassett. 394 pages. Price, \$3.50. New York: MacMillan Co., 1934.

The author states the purpose of the book is to present a panoramic sketch of the various ways in which mental hygiene may be of importance and value and to indicate the places in the present organization of community life where it may possibly function with profit.

The book satisfies the author's purpose. Each chapter contains an instructive and interesting discussion of mental hygiene in relation to a particular department of community life, including medicine, nursing, social service agencies, delinquency and law, parental education and so on. Suggestions for the investigation of the department complete each chapter. The book is worth one's study.

ROYAL C. GRAY, M.D.

NEW AND NON-OFFICIAL REMEDIES, 1934, containing descriptions of the articles which stood accepted by the Council on Pharmacy and Chemistry of the American Medical Association on Jan. 1, 1934. Cloth. Price, Postpaid, \$1.50. Pp. 510; lx. Chicago: American Medical Association.

New and Non-official Remedies, 1934, has the same pleasing format and helpful mechanism that has characterized it in past years. The enrichment of the indexing started a few years ago is continued and its value even increased by some desirable simplification of cross references.

The Council has made the usual careful revision of the book. The general article Lactic Acid-Producing Organisms and Preparations has been practically rewritten. The chapter on Arsenic preparations has undergone some revision, especially in the statement concerning Neoarsphenamine. The descriptions of Chiniofon and Vioform have been revised in the light of recent developments in the treatment of amebiasis. The article on Ethylhydrocupreine has been revised to delete references to Optochin Base, which has been omitted; Optochin Hydrochloride has been retained, being recommended only for external use. The description of Typhoid Vaccine has been revised to give the dosage of the combination of typhoid and paratyphoid organisms and to mention the use of typhoid vaccine in nonspecific protein therapy. A number of revisions of the Council's Rules have been made, particularly with reference to the names of products, which is one of the most frequent and troublesome of the problems with which the Council has to deal. Comparison with last

year's volume will show that revisions of more or less importance occur in many other chapters.

Among the preparations newly included in this volume are: Aminophylline, a double salt or mixture of theophylline and ethylenediamine, with the advantage of greater solubility over other theophylline preparations; the new alum precipitated diphtheria toxoid; Neo-Iopax, a new medium for intravenous urography; Benzedrine, an ephedrine substitute; serums containing type II pneumococcus antibodies, which the Council has recently recognized as worthy of clinical trial in view of improved preparations and technic; Autolyzed Liver Concentrate and Extralin, two new liver preparations for use in the treatment of pernicious anemia; Metycaine, a new local anesthetic; and Sodium Morrhuate, a salt of the fatty acids of cod liver oil, proposed for use as a sclerosing agent.

ANNUAL REPRINT OF THE REPORTS OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR 1933. Cloth. Price, Postpaid, \$1.00. Pp. 188. Chicago: American Medical Association.

The main bulk of volume, which is, incidentally, considerably increased over that of recent annual volumes, is taken up with reports on products which the Council has found unacceptable for inclusion in New and Non-official Remedies. Of special note are: The report on Alpha-Lobelin, a drug upon which the Council in 1927 issued a preliminary report but which is now found not to have established itself as a respiratory stimulant of as great usefulness as carbon dioxide and oxygen; the report on a number of preparations marketed by the Upjohn Company with unwarranted, misleading and unscientific claims; the report on Clavipurin, a preparation of the alkaloids of ergot, marketed without adequate declaration of the composition and without adequate standardization under a nondescriptive proprietary name with unwarranted therapeutic claims; the report on Diampsal, another pyridine derivative proposed for use in bacterial infections, convincing evidence for the therapeutic value of which is lacking; the report on Euphydigital, an irrational mixture of digitalis and a theophylline preparation marketed under an uninforming, proprietary name, with exaggerated and unwarranted claims for its therapeutic value; the report on Guphen, stated to be the guaiacol ester of phenylcinchoninic acid, marketed with unwarranted therapeutic claims under an uninforming, proprietary name and having no proved advantage over its constituents administered separately; the report on Niazo, a pyridine compound of unsubstantiated value as a urinary antiseptic; the report on Omnadin, a preparation recognized for use for nonspecific lipoprotein therapy practically as a cure-all; and the report on a group of endocrine preparations of the Rovin Laboratories variously unacceptable as being of indefinite composition and of undemonstrated therapeutic value.

A feature of marked current interest in this volume is the preliminary report on Alpha-Dinitrophenol, the new drug for acceleration of cellular metabolism. The Council voices a warning on the dangers attending the use of this drug; this warning has been increasingly justified in reports of fatalities since the appearance of the Council's report in July of last year. Other preliminary reports which make this volume one of the most interesting issued by the Council in recent years are those on Dilaudid, a new narcotic drug related to morphine; Fuadin, a new antimony compound for use in the treatment of bilharziasis and granuloma inguinale; and Hippuran, a new product for intravenous and oral urography. The comprehensive and definitive special report on estrogenic substances furnishes a much needed review of the present status of such products in gynecologic therapy. The Council insists upon the doctrine that basic laboratory investigation of these substances should precede clinical use. Of interest to

hospital authorities, especially in connection with the book *Hospital Practice for Interns* recently issued by the Council in collaboration with the Council on Medical Education and Hospitals, is the special report, *The Hospital Formulary*, by Hatcher and Stainsby of New York. It outlines a plan characterized by the highest regard for the principles of rational drug therapy. Of more general interest is the Council's second report on the intravenous use of barbital compounds which is the result of a questionnaire sent to representative physicians. In view of the answers to the questionnaire, the Council reaffirmed its previous decision concerning the limitations of intravenous use of barbital compounds; namely, that these preparations should be administered intravenously only in a limited number of conditions in which administration by other routes is not feasible. The report carefully details these conditions. The lengthy report on the omission of Pyridium is an outstanding example of the meticulous fairness characteristic of the Council's treatment of the manufacturers of commercial preparations. In connection with the omission of Pyridium should be noted the report which declares Azophene (Mallophene) not acceptable. This product has been shown to be identical with Pyridium and the Council considers the claims for its usefulness as a local, general, or urinary antiseptic as unwarranted, as are those for Pyridium.

THOUGHTS OF A DOCTOR ON THE FIRST NIGHT OF HIS MUCH NEEDED VACATION

This night I sleep!
I lay me down upon this bed,
Dame Morpheus be my guest,
And give me thy caresses!
I put my pillow 'neath my head.
I sleep!

This night I sleep!
The whole darn world can go to pot.
I've checked out for the hour.
No frightened dame back home
Can call and ask *me* what she's got.
I sleep!

This night I sleep!
Tonight I'm going to get some rest.
This 'phone won't ring tonight
And wake me with a start
To answer to a friend's behest.
I sleep!

This night I sleep!
No knock can sound upon my door
And rouse me from my slumber.
No one can harm my rest
By waking me at half-past four.
I sleep!

This night I sleep!
No premonitions now can fill
My troubled mortal soul
Of an urgent call to go
To a farm by a marsh by a far off hill.
I sleep!

This night I sleep!
I need not answer to the call
Of someone's wife in labor.
Ah! pillow hold my head!
My competitors can have it all!
I sleep! !

L. J. ALGER, M.D.

MINNESOTA MEDICINE

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INDICATIONS FOR OPERATIVE INTERFERENCE IN MIDDLE EAR SUPPURATION*

HORACE NEWHART, M.D.

Minneapolis

SUPPURATIVE disease of the middle ear is so common, especially among children, that we are prone to forget the serious possibilities inherent in every discharging ear. Reliable statistics gathered by Koerner, substantiated by Bezold, showed that four-tenths of one per cent of all deaths occurring under the age of thirty in Prussia were due to ear diseases. Statistics for our own country, were they available, would disclose even a higher death rate.

With a better knowledge of the anatomy and pathology of the temporal bone, improved methods of diagnosis and surgical technic, and, above all, with a clearer understanding of the indications for operative interference, now well defined, the modern otologist when he encounters a fatal case of suppurative otogenous disease is reluctantly obliged to pronounce to himself the sad and silent verdict: "This patient should have lived." In other words, under modern care deaths from the complications of middle ear inflammation are largely preventable.

This presentation has been stimulated chiefly by a recent study of the cases coming to operation in the ear clinic of the University Hospital during the past three years. Time does not permit case reports nor any statistical analysis. For our present purpose it is sufficient to state, without any criticism or apology, and in spite of many notable recoveries when complications were present, that the mortality has been unfortunately too high. A very extenuating circumstance is found in the fact that often the general practitioner and pediatricist who attended these patients first were not themselves consulted until complications had

already occurred. Many of these patients were admitted in a critical condition.

The first object of operative interference in a case of middle ear suppuration is to save life by removing the possibility of a serious complication; the second object is to conserve the hearing.

One of the most perplexing questions confronting the physician since the beginnings of otology has been, "What are the definite indications for operation?" In the following paragraphs we shall attempt to briefly summarize what is the best otologic opinion on this very important subject. There is not time to refer to individual authors.

The first fundamental principle in dealing with middle ear inflammation is that with every severe infection of the middle ear there occurs more or less involvement of the adjacent structures, *i.e.*, the antrum and neighboring mastoid cells or bone. A second recognized fact is that the symptoms, course, outcome and indications for operative interference in any case of purulent otitis media are largely determined by three factors: (1) the type and virulence of the invading organism; (2) the resistance of the patient; (3) the anatomical structure of the invaded temporal bone.

1. Under the first head it should be recalled that there is great variation in the virulence of the invading germ at different seasons and in different epidemics. Of the different organisms producing otitis media, the streptococcus hemolyticus and the streptococcus mucosus are the ones most prone to cause complications, the former through early involvement of the blood stream, the latter, because of its characteristic to insidiously and progressively destroy the bony

*Read before the Southern Minnesota Medical Association, New Ulm, Minn., Sept. 26, 1933.

structures, with an excessively high mortality from complications.

2. The resistance of the patient is adversely affected by infancy and the existence of preceding or concomitant debilitating diseases, notably the exanthemata, influenza, diabetes, tuberculosis and others.

3. The anatomical structure of the temporal bone largely determines the likelihood of its serious invasion, the question of spontaneous recovery, the tendency to complications and the presence or absence of the usual external signs of extension to the mastoid.

The temporal bone of the infant differs from that of the adult in ways wherein it is more susceptible to bacterial invasion. The auditory (eustachian tube) is shorter, more patent and more nearly horizontal. The bone itself presents defects as dehiscences and ununited sutures, affording pathways for deeper infection. The lining membrane of the tympanic cavity is soft, of low resistance and in certain areas is not firmly attached to the bone, which it poorly protects. It is a matter often overlooked that the infant temporal bone, while showing no development of a mastoid process, may, nevertheless, become invaded from the middle ear and undergo extensive destruction.

The degree of pneumatization of the temporal bone is of the greatest importance. The large celled type is best able to take care of itself, and invasion in such a temporal bone often undergoes spontaneous resolution. The small celled type, because of a greater tendency to obstruction of its drainage, more readily suffers pressure absorption and destruction of its trabeculae with consequent cavitation. With a thick cortex we may have extensive destruction in the depths of the temporal bone, without the usual external signs, but with a greater tendency to break down in the direction of the endocranium. The non-pneumatized and the sclerotic or infantile type is regarded as the most dangerous when it becomes infected.

Another recently recognized factor of great importance in determining the seriousness of an extension of middle ear disease, is the degree of pneumatization of the petrous apex. While pneumatization of other parts of the temporal bone is completed at the end of the fourth year, the petrous apex undergoes pneumatization until the fifteenth year. Infection of the apex is a com-

plication whose serious significance has been appreciated only during the past few years.

What has just been stated concerning the architecture of the temporal bone should indicate the value of the roentgenogram in many cases of middle ear infection. It should also suggest its limitations.

Since every severe middle ear inflammation is accompanied by some involvement of the adjacent parts, we must recognize the fact that we are dealing with a limited or extensive mastoiditis which, according to the structure, is potentially a surgical mastoiditis, or, under favorable conditions, may spontaneously clear up even after postauricular or antral tenderness and tip tenderness have been present. Cases accompanied by tenderness over the zygomatic root and especially over the emissary vein are not so prone to spontaneous recovery. The former conditions usually indicate a perisinus abscess. On the other hand, we may encounter extensive destruction without external signs, even when there has been no discharge, or after the otitis media with perforation has healed. Such cases are very deceptive. They occur frequently with measles and scarlet fever and in otitis media due to streptococcus mucosus. Extension to the mastoid may escape notice until the appearance of a fully developed complication. A streptococcus mucosus infection should be suspected when the drum head shows a pale infiltration and the middle ear is slow in clearing up. In these cases the roentgenogram often reveals a surprising amount of destruction. Bacteriological and blood examinations should be made in all such cases. Cases due to the streptococcus mucosus constitute about 13 per cent of treated acute middle ear suppuration. They occur most frequently after the forty-fifth year.

Another fundamental surgical principle to be always remembered but never to be made the excuse for procrastination, is that in acute cases and in acute exacerbations of chronic cases, we should postpone operative interference long enough to allow the building up of immunity against the invading organism. Aside from this the contra-indications against operation are negligible. Pregnancy is not a contra-indication, nor is lues. Tuberculosis, though accompanied by greater surgical risk, is not a contra-indication.

We should not operate without a complete history and a careful general physical examination,

close neurological and ophthalmological scrutiny, all the usual laboratory tests and a roentgenogram.

Specifically, according to the latest consensus of opinion the indications for operating in acute cases of middle ear suppuration are as follows:

1. We operate at once in all cases, after adequate conservative treatment has been tried, when there is persistent pain and tenderness over the mastoid tip and a purulent discharge has existed for one week. In young children with symptoms of meningeal irritation or with severe gastro-intestinal symptoms and desiccation, we may to great advantage operate the fifth or even the fourth day after the onset of the discharge. In adults a persistently high temperature with the above symptoms often indicates a thrombophlebitis of Koerner caused by a hemolytic streptococcus and also calls for very early operation.

2. Immediate operation is indicated when there is swelling and fluctuation over the mastoid region, especially the tip, or over the zygomatic root, or when there is a hard infiltration toward the neck constituting a Bezold abscess or whenever there occurs edema of the posterior superior auricular canal wall. This last is a most reliable indication even in the absence of other positive indications for surgery.

3. Even though all other symptoms may be absent, we should operate whenever, after adequate treatment, there is a persistent discharge lasting over six weeks. Failure to observe this rule is the cause of the majority of cases of chronic suppuration, *i.e.*, a chronic mastoiditis.

(At this point we would deprecate the fallacy of repeated incisions of a drumhead whose opening is already giving adequate drainage. The diseased area in such a case is beyond the middle ear. It is also futile to attempt to relieve aural pain by this procedure when it is due to retention and pressure in the mastoid and not in the middle ear, or is due to a circumscribed meningitis.)

4. Operation is urgently demanded with the onset of a rapid, severe loss of hearing, nystagmus, vertigo, nausea and vomiting. Here we have a threatened or actual labyrinthine involvement, with possible extension through the internal auditory meatus and a consequent diffuse meningitis or cerebellar abscess.

5. The appearance of a facial paralysis also calls for prompt surgery. It may signify destruction in the direction of the vestibule and an impending endocranial complication.

6. A further indication for surgery is the appearance during an otitis media of paralysis of the abducens nerve accompanied with homolateral headache and pain in the eyeball. This frequently indicates a petrositis which is often cured by an early cleaning out of the mastoid whereby the affected petrous cells are drained.

7. The appearance of symptoms pointing to the beginning of an endocranial complication, such as headache, especially unilateral, local discomfort, nausea and the classic neurological signs demands an exploratory operation. Delay for the formation of a capsule in case a brain abscess is diagnosed, is usual but should not be for too long a period. The early cleaning up of the infected area and draining of an epidural abscess may avert a more serious complication. We should recall that a circumscribed meningitis is nature's method of preventing a diffuse meningitis or brain abscess.

8. In the case of early involvement of the blood stream, evidenced by increased leukocytosis, the characteristic chills and temperature curve, even before a positive blood culture is obtained, we should thoroughly operate upon the mastoid and drain the perisinus abscess with the expectation of a fair chance of arresting a sinus phlebitis or a septicemia.

9. A further indication for early surgical intervention is met in patients who have been the subjects of one or more previous operations on the temporal bone. Here we may have old tracts leading to areas covered with granulations or organized connective tissue of low resistance, the dura often having already been exposed. Under such conditions delay may invite serious complications.

10. The indication is to operate earlier rather than later in cases associated with the exanthemata and debilitating diseases.

The radical mastoid operation is performed chiefly to cure a chronic suppuration of the middle ear which does not yield to persistent, thorough, conservative treatment. This may include ossiculectomy and even removal of the lateral attic wall. It is also indicated in both acute and chronic otitis whenever it becomes necessary to explore either the middle or posterior fossæ in searching for an endocranial complication.

Briefly stated, the indications for resorting to

the radical mastoid operation in chronic suppurative cases are as follows:

1. Failure to secure a dry ear by the usual conservative treatment. This is the most important and the one most frequently ignored.
2. Evidence of labyrinthine involvement.
3. Evidence of the development of brain abscess, meningitis or pyemia.
4. The formation of a subperiosteal abscess.
5. The appearance of facial paralysis.

We most frequently fail in our duty to the patient with a chronic suppurative otitis media. As a rule, he has not been sufficiently impressed with the importance of securing a dry ear. Failure to attain this condition by adequate treatment indicates that the bone is diseased in its deeper parts, the affected regions being often surrounded by sclerosed areas. How serious the condition may be even the roentgenogram does not reveal. Cholesteatoma frequently erodes extensive areas exposing them to the possible invasion of a virulent organism which may enter through the upper respiratory tract or through the blood stream. No one can tell when, under conditions of lowered resistance, a spectacular and alarming flare-up may occur. He who advises a patient to disregard a persistent discharge

from the ear as a mere trifle, to be ignored until definite symptoms indicating the need of operation appear, is inviting disaster to his patient and criticism for himself. The mortality from such cases where operation becomes necessary after the occurrence of a complication is extremely high, whereas it is practically nil where operation is properly performed before complications set in.

Conclusions

1. Operations for the cure of suppurative diseases of the middle ear, whether acute or chronic, should be performed promptly and fearlessly as soon as surgical intervention is definitely indicated, if we would materially reduce the denbably high death rate from these common ear diseases.

2. It is far safer to err in the direction of operating too early rather than too late.

3. The responsibility for the recognition and adequate care of cases of suppurative otitis media needing surgical attention rests more heavily on the general practitioner and the pediatricist who see them first than upon the otologist, who frequently is not called in consultation until after serious complications have arisen.

THE RELIEF OF ACUTE ASTHMA BY THE INTRAVENOUS ADMINISTRATION OF CONCENTRATED GLUCOSE SOLUTION*

Report Of Cases

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HYPERTONIC glucose solutions have been administered intravenously in uremia, myocardial insufficiency, infectious disease, bichloride poisoning, tetanus, ocular disorders, skin lesions, nervous disturbances, and edema of the lungs. In severe and prolonged bronchial asthma it was assumed that the patient suffered also from a secondary pulmonary edema, and that, if the edema was relieved, the patient's asthma would be improved. On the above assumption and observation, a 50 per cent glucose solution was se-

lected for intravenous administration. Such a solution placed in the vascular system would withdraw fluids from the tissues and act also as an excellent diuretic.

Report of Cases

Case 1.—Chronic bronchitis, bronchiectasis, bronchial asthma, cholelithiasis.

The patient was forty-eight years old, married and had eight children. The past history was negative except for a tonsillectomy. The present trouble began five years ago with an upper respiratory infection, leading to a chronic bronchitis and occasional asthmatic attacks. The asthmatic attacks gradually became more frequent and longer in duration. In the morning the patient

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would have prolonged coughing spells, and then raised a great deal of sputum. Various drugs, vaccines, and inhalations had been tried with very little relief. On admission to the hospital she was receiving in twenty-four hours, two hypodermics of adrenalin chloride, 8 m. each, 1/6 gr. hypodermic of morphia, and two capsules of ephedrin-amytal compound. The physical examination was negative except for typical findings of a chronic bronchitis, bronchiectasis, bronchial asthma, and a symptomless cholelithiasis.

The patient was admitted to the hospital on April 24, 1933. On April 26 she received intravenously 15 c.c. of a 50 per cent glucose solution. No particular change was noted. On April 27, she received 20 c.c. of a 50 per cent glucose solution. The next day she said the breathing was easier. On April 28, she received 30 c.c. of a 50 per cent glucose solution. The asthma disappeared. No further adrenalin, ephedrin, or opiates were necessary. The cough was embarrassing and considerable sputum was being raised daily. Since there were no further attacks for a week the patient was discharged from the hospital and advised to take mild sedatives for controlling the cough.

She appeared at the office on October 2, 1933, stating that she felt quite well except for the cough, and free from asthma until about a week ago. She had again typical findings of a bronchial asthma. On October 2, 5 c.c. of a 50 per cent glucose solution was given intravenously, and on the third, fifth, and sixth, 50 c.c. of a 50 per cent glucose solution was given at the office. She was again very much improved.

Comment: Although the treatment was not remarkable it was nevertheless encouraging. After the first series of glucose administrations the patient was free from asthma for nearly five months. The second group of glucose injections also relieved the asthma.

Case 2.—Chronic bronchitis, bronchial asthma.

The patient was forty-two years old, a female, and married, with a negative past history except for bronchial asthma for one year, twenty years ago, and a "nervous breakdown" in 1931.

In the spring of 1933 following an upper respiratory infection she developed a chronic bronchitis with nocturnal attacks of bronchial asthma. On June 14, 1933, she entered St. Joseph's Hospital and was given six hypodermics of adrenalin chloride, 8 m. each, and two hypodermics of pantopon, gr. 1/3, for the relief of the asthma in the first twenty-four hours. The physical examination was negative except for typical findings of a chronic bronchitis with bronchial asthma. The laboratory findings were also negative except for an eosinophilia of 9 per cent.

June 15, she was given 80 c.c. of a 50 per cent glucose solution intravenously. Following this administration only two hypodermics of adrenalin in twenty-four hours were necessary to control the asthma. On June 16, she was given 100 c.c. of a 50 per cent glucose solution intravenously. The asthma disappeared, no further glucose was given, and she was discharged from the hospital August 2, 1933.

On July 31, 1933, she was readmitted to the hospital again stating that she had been free of asthma for one

month and then it recurred. On July 31, and August 1, she was given 100 c.c. of a 50 per cent glucose solution intravenously. The asthma disappeared and she was discharged from the hospital August 2, 1933.

Comment: The results in this case were almost dramatic. Two injections relieved the asthma, and when it recurred one month later, two injections again were sufficient to control the attacks. The patient still has chronic bronchitis, and may again have asthmatic attacks.

Case 3.—Chronic bronchitis, bronchial asthma.

The patient was married, thirty-five years old, and had a negative past history except for frequent "colds." The present onset of asthma began nine years ago following an upper respiratory infection. The general physical examination showed septic tonsils, typical findings of bronchial asthma, left inguinal hernia, and a 5 per cent eosinophilia.

He was admitted to the hospital on July 27, 1933, and 100 c.c. of a 50 per cent glucose solution was given intravenously. The asthma disappeared, the tonsils were removed, and a few days later he was discharged from the hospital. On October 12, 1933, in response to a letter he appeared at the office, and said that he had had no asthmatic attacks but on examination there was some wheezing in the chest. He was given 50 c.c. of a 50 per cent solution of glucose on October 12 and 19, for the determination of its effect on this type of breathing. The breathing was definitely improved.

Comment: The patient's attacks varied a great deal in duration, and although he thought that the treatment was most efficient, one should cautiously draw conclusions from a single injection. The effect on the asthmatic bronchitis was said to be favorable.

Case 4.—Chronic bronchitis, bronchial asthma.

The patient was forty-three years old, married, and the past history showed frequent colds, operated sinuses, and a tonsillectomy. The asthmatic attacks began six years ago. She had been treated by autogenous vaccines, adrenalin chloride, ephedrin, various medicated inhalations, opiates, and hypodermics of morphia. There were typical findings of an asthmatic bronchitis with an eosinophilia of 14 per cent.

When the patient was examined she was suffering only with an asthmatic bronchitis. On September 12, and October 3, 1933, she was given 50 c.c. of a 50 per cent glucose solution intravenously to observe its effect on the asthmatic bronchitis. The breathing was improved.

Comment: The patient stated she breathed much easier after receiving the injections, and the last examination of the chest revealed no whistling sounds. Since asthmatic breathing has been known to vary a great deal in severity from day to day, or even during the same day, definite inference must be made with caution.

Indications

At the present time it would seem that good results with this form of treatment were obtained in the long, severe, and continuous asth-

matic attacks, and asthma superimposed most probably on an asthmatic bronchitis due to an upper respiratory infection. Less remarkable results have been noted also in the lighter forms of asthma. It is possible that with increased knowledge obtained by trial and experiment very definite indication will be established for the type of asthma, the optimal dose, and the frequency of administration.

Administration

A word about the administration may prevent accidents and unfavorable results or reactions. A 50 per cent sterile solution of glucose was heated to 95 degrees Fahrenheit to avoid constitutional reaction. This solution was administered slowly by syringe through a medium sized needle. If the needle is too small there may be great difficulty in forcing the solution through the needle. If the needle is very large the solution may run into the arm too rapidly and produce a clot at the point of injection. Placing the arm in a horizontal position or even slightly lower than the forearm will also aid in preventing the coagulation of blood in the vein. Occasionally during the last part of the glucose administration the patient may complain of soreness in the arm. The pain follows the course of the vein and is undoubtedly due to an irritation of the venous wall by the concentrated glucose solution. It is possible that less concentrated solutions may give the beneficial pulmonary results and yet reduce the local danger of a thrombosis, or phlebitis.

Discussion

An intensive search of the medical literature revealed only one article published by Schafer¹ in 1927 under the title: "Treatment of Bronchial Asthma by Intravenous Injection of Grape Sugar." In the article reference was made to "Stein and Others," but their publications could not be found. He treated fourteen patients, ranging in age from 16 to 48 years. The duration of asthma was one to seven years. One patient, however, had asthma for two months only. Colds, fright, linseed oil, and wood pulp were stated as the causative agents. Intravenous administration of a 20 per cent glucose solution in 10 c.c. doses, was given for six to twenty days consecutively. Eleven patients had no reaction, while three showed a slight fever about ten hours after the injection. The results showed

that during the treatment the attacks became less severe every day. In nine patients the attacks were gone for five months. In one case the attack recurred in less than a month, and was again relieved by the administration of glucose. When it recurred the third time, a 30 per cent solution was given, and the patient remained well for three months.

All of our patients attributed the asthma to an upper respiratory infection. The duration of asthma was from six months to nine years. Every focus of infection had been eliminated except in the third case, where septic tonsils were found and later removed. Two of the patients came under observation during a continuous siege of severe asthma over a period of several weeks. One had an acute attack superimposed on a chronic asthmatic bronchitis, and another had chronic asthmatic bronchitis only. In the first case, three intravenous injections of glucose eliminated the asthma, and when it recurred nearly five months later four injections again relieved the asthma. The second case was controlled by two injections and one month later the recurrence was also relieved by two injections. In the third case one injection was given during an acute attack, and in twenty-four hours the patient was free from asthma. The action on asthmatic bronchitis was less favorable. There was no constitutional reaction, but locally a few times a clot formed in the vein at the point of injection. The administration was then discontinued and the solution given in another vein.

The mechanism through which glucose acts is not clear. Some contend that the beneficial results follow an improved effect on the myocardium, while others consider glucose as an antidote for the toxic metabolites. The most common view, however, attributes the improvement of the patient to changes in the osmotic pressure in the tissues. Briefly, the concentrated glucose solution introduced into the vascular system withdraws fluids from the tissues and the surplus fluid is then eliminated by the kidneys. Whether or not similar results could be obtained by giving the patient large doses of ammonium salts by mouth or salyrgan by vein has not been demonstrated. Whatever may be the action, the glucose has a favorable effect on the intensity, as well as on the frequency, of the attacks.

The action of glucose is slow, requiring days, rather than minutes as in the case of adrenalin,

to show results. The effects, however, are more lasting and can be calculated in weeks or months rather than in hours or days. It is not a cure for bronchial asthma, but for its relief the treatment may be recommended. Indirectly it may also favorably influence the chronic bronchitis.

Summary

1. Four cases of bronchial asthma, secondary to an upper respiratory infection, were treated intravenously with a 50 per cent glucose solution.
2. Various amounts were tried, but the best results in the bedridden patients were obtained with 100 c.c. of glucose solution given consecutively for two or three days.
3. In the ambulatory type 50 c.c. of a 50 per cent glucose solution administered for several days gave encouraging results.

4. Concentrated glucose solution relieved the intensity as well as the frequency of the asthmatic attacks.

5. The attacks of asthma sometimes were relieved completely for several months.

Conclusions

1. It is possible that the intravenous administration of glucose solution may become a permanent adjunct in the routine treatment of severe bronchial asthma.
2. From the above study and reports in literature too little is known about this method of treatment to make any definite claims for it.

Reference

1. Schafer, M. M.: Treatment of bronchial asthma by intravenous injection of grape sugar. *Vrach. Gaz.*, 31:1584-1589, 1927.

THE EYE IN CARDIOVASCULAR DISEASE*

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THERE has been, in the past thirty years, a definite increase in the incidence of cardiovascular disease. This is only partially accounted for by the gradually increasing length of life and the consequently larger percentage of the population attaining the age when certain forms of disease of the heart and blood-vessels are more common. Some forms of cardiovascular disease are obviously on the decrease. Improved methods of treatment of syphilis and more general recognition of the importance of the elimination of foci of infection have been responsible for the fact that luetic disease and the various clinical entities which were formerly grouped under the heading of "rheumatic" affections of the heart and blood-vessels are less frequently encountered than they were twenty or thirty years ago. This decrease has, however, been more than counterbalanced by the increase in the number of cases of the coronary sclerosis-hypertension group.

Naturally each organ reacts to the effects of abnormalities of the circulatory system in general and of its own blood-vessels in particular in a manner determined by its own particular struc-

ture and function. The effect of vascular disease on the eye is influenced by the delicacy and complexity of the eye tissues and by the fact that the circulation of the retina is largely effected by terminal vessels which do not anastomose, thus usually precluding the possibility of the development of a collateral circulation in the event of a partial or complete occlusion of a vessel.

The study of the eye changes in cardiovascular disease is of unique interest and importance both from a diagnostic and a prognostic standpoint. Here, with the ophthalmoscope, can be observed in the living patient, under magnification, the blood-vessels of the retina, affording an opportunity to detect the presence of vascular pathology and to observe its progress.

The pathologic states in the cardiovascular system which are, at times, reflected in the eye may be grouped under the following headings: (1) organic disease of the heart; (2) sclerosis or aneurysm of large vessels giving rise to pressure on adjacent nerves with consequent impairment of function; (3) hypertension; (4) sclerosis of the vessels of the choroid and retina; (5) embolism and thrombosis of the intrinsic blood-vessels of the eye; (6) diseases of the blood

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which alter its composition and secondarily affect the function of the capillaries and the integrity of the capillary walls.

Disease of the heart may make itself evident in the eye by pulsation of the retinal arteries. While venous pulsation is often observed as a physiological manifestation, visible pulsation of the arteries of the retina is always pathological. In left ventricular hypertrophy associated with hypertension an arterial pulsation extending to the periphery of the fundus is not uncommon. A true pulse wave, synchronous with the radial pulse, is seen in aortic regurgitation or aortic aneurysm as well as in some cases of hyperthyroidism. Capillary pulsation appears as a reddening of the optic disc in systole and a blanching in diastole and is observed only in aortic regurgitation. Embolism of the central artery of the retina sometimes occurs with mitral stenosis, especially in the presence of a fresh endocarditis. In congenital heart disease the retinal vessels, particularly the veins, are usually dark and greatly engorged; sometimes small hemorrhages are present.

Thickening and sclerosis of the internal carotid or the ophthalmic arteries may give rise to sufficient pressure on the optic nerve to cause atrophy with consequent impairment or loss of vision. C. N. Spratt has reported a very interesting case of aneurysm of both vertebral arteries. The patient had had severe headaches for ten years; at first frontal and finally localized more in the left occiput. The vision remained good but he was led to consult an oculist because of a diplopia resulting from a complete paralysis of the external rectus muscle. Anesthesia on the left side of face, anosmia, horizontal nystagmus accentuated on looking to the left, death and autopsy followed.

Hypertension is a very imperfectly understood clinical entity. It is, of course, a symptom and not a disease *per se* and would seem to be the manifestation of some underlying pathological state which may, in some cases, be the result of a toxemia or of some metabolic disturbance; in others, be secondary to an essential derangement of the vasomotor centers in the central nervous system. Our present knowledge as to the etiology and essential nature of hypertension is extremely limited but it is clear that it first manifests itself as a pure vasospasm and that as this condition persists the primary abnormal physio-

logic process gradually gives rise to organic changes in the vessel walls. It is natural, therefore, that the first evidence of hypertensive disease observed in the fundus should take the form of a vasospasm which may affect the central artery and thus cause an ischemia of the entire retina (except the outer layers which are supplied by the choroidal vessels) or may involve a branch, in which case only a sector of the fundus is affected. This is usually the forerunner to the development of a typical hypertensive retinopathy but it may, in some cases, disappear, leaving no visible fundus changes and no impairment of function. (Similar vascular spasm has been described in Raynaud's disease, in lead poisoning and in migraine.) In the hypertension fundus, therefore, the arteries, from the first, appear to be contracted and the veins disproportionately large. The arterial narrowing may affect the entire length of the vessel or only segments of it. In addition to the variations in caliber of the vessels' increased tortuosity, especially of the smaller branches, has been described, but this is of comparatively little diagnostic importance since great variation in the tortuosity of vessels is observed in the normal fundus. Marcus Gunn over forty years ago described the characteristic brightening and widening of the central light streak of the arteries which he likened to the metallic appearance of bright copper wire. Whitish lines may appear along either side of an artery and sometimes, in the later stages, the arteries are reduced to threads, having become thrombosed and gradually obliterated. However, as Burch says, "these are evidences of the type and not of the simple fact of elevated blood-pressure." That is these changes are the result of organic disease in the vessel walls which occurs secondarily to continued hypertension. Also characteristic of the hypertension fundus is the effect produced upon the veins by the overlying arteries. Under normal conditions it is possible to see the vein through the artery at the point of crossing and the crossing has no apparent effect upon the form or level of the vein. In hypertension the veins show the effect of the increased arterial pressure and are compressed or, at least, pushed back into the retina. In the later stages in advanced cases the vein is invisible at the point where the artery crosses it and may be considerably distended for some distance peripheral to the point of crossing. There also develops a definite change in the angle

at which the arteries cross the veins. This more nearly approaches a right angle as time goes on, the alteration being due to a contraction secondary to degenerative changes in the perivascular tissue at the point of crossing.

It is, of course, axiomatic that hypertension is often observed in the absence of arteriosclerosis as sclerosis may occur without hypertension. The arterio-venous compression described is not necessarily a sign of retinal arteriosclerosis but may be present in advanced and characteristic form in a pure hypertension. The continued presence of a hypertension eventually gives rise to organic changes in the arteries, arterioles and capillaries. The exact nature of the relationship between the raised blood-pressure and lesions found in the retina is still imperfectly understood. We do not know why, in many cases, a maximal hypertension may exist for a long time and never have any apparent effect upon the retina, while in others, with identical general physical findings, the typical fundus picture of a hypertensive neuroretinopathy is seen. At any rate, all of the retinal lesions occurring in hypertensive retinopathy are to be ascribed primarily to the ischemia of the retina produced by the spasm of the choroidal and retinal arteries which occurs as a part of the general vasoconstriction which characterizes hypertension. Often the first sign to be noticed after the contraction of the vessels appears is an edema of the nerve head. The disc is swollen and the margins indistinct. It may be hyperemic in the "red" type of hypertension (that is, in the essential type of hypertension when renal function is good), and pale in the form which occurs in association with glomerulonephritis, in essential hypertension with renal insufficiency, in eclampsia gravidarum, lead poisoning and urinary obstruction when associated with glomerulonephritis. The color of the disc is naturally affected by the hemoglobin content of the blood. In the late stages of essential hypertension there is found the characteristic pallor of optic atrophy. Sometimes the elevation of the disc may be sufficient to cause an appearance which cannot be distinguished from that of the true choked disc of increased intracranial pressure. Cushing and Bordley described a case of chronic renal disease with hyperpiesis and extensive retinal lesions in which the intracranial pressure was so greatly increased as to necessitate a subtemporal decompression. However,

increased intracranial tension is observed in only a small percentage of cases of hypertensive retinopathy. In the great majority of patients, in spite of a considerable swelling of the disc and extensive retinal lesions, the intracranial pressure is well within normal limits. The edema gradually spreads out for a greater or less distance into the adjacent retina and gradually becomes whiter and more opaque. If the edema involves the macular region there is a sudden and profound diminution of vision. Frequently following edematous changes there appear scattered through the fundus, particularly in the area near the disc and between it and the macula, white spots of various sizes and degrees of brightness. In the early stages they often have a cotton wool appearance, later becoming more sharply outlined and "harder" in appearance. This change is probably due to the absorption of the edema. These "cotton wool" spots which have so often been erroneously referred to as "exudates" are really the result of actual tissue necrosis and are, essentially, minute infarcts due to occlusion of the arterioles. The arrangement of these spots and streaks in a star figure in the macular region has been described as characteristic of "albuminuric retinitis" but it may be found in any disease in which there are degenerative changes in the retina. Hemorrhages are usually but not always present. They are often flame shaped, sometimes linear or rounded and irregular, the shape being dependent upon their location, the radially elongated hemorrhages being in the nerve fiber layer, the others lying more deeply. The hemorrhages are almost always capillary in origin. They may rarely be subhyaloid. (Small hemorrhages in the retina are sometimes seen in acute or subacute glomerulonephritis and these are analogous to the purpuric spots in the skin which are not uncommon in this condition.)

As early as 1836, Bright, in his epochal treatises on diseases of the kidney called attention to the fact that impairment of vision, apparently attributable to the nephritis, occurred in a certain percentage of cases. In 1850, several years before the discovery of the ophthalmoscope, Turck demonstrated the presence of areas of what appeared to be fatty degeneration and concluded that the reduction in sight was due to disease of the retina. The validity of his conclusions was demonstrated as soon as the examination of the fundus of the eye became possible. Liebreich,

in 1859, gave the first accurate description of what he termed "albuminuric retinitis" and for many years under this generic term were included three pathogenetically distinct retinal diseases—hypertensive neuro-retinopathy, arteriosclerotic retinopathy and choked disc due to edema of the brain. In the face of accumulating evidence to the contrary there has been an extraordinary persistence of the old conception that primary disease of the kidney caused the retention of certain toxic substance in the blood which secondarily affected the tissues of the retina. This accounts for the continued use of the term "albuminuric retinitis" in spite of the fact that the condition is not a retinitis since the lesions are for the most part not inflammatory in nature and it is not "albuminuric" since it has no connection with the presence or absence of albumin in the urine; in fact, it is precisely in the nephroses in which albuminuria is at the maximum that retinal changes do not ever occur. At any rate, it is now, I believe, generally accepted as an established fact that retinal changes are not encountered in renal diseases unless hypertension is or has been present. As Fishberg says, "That, in general, all the changes in the fundus observed in hypertension and renal disease are primarily due to the hypertension is obvious from the fact that they never occur in its absence." Even in the presence of disease causing widespread destruction of kidney tissue such as tuberculosis, neoplasms, septic kidney, etc., no retinal changes are found unless hypertension has supervened. If a hypertensive retinopathy is found in the presence of a normal or subnormal blood pressure, it is because of myocardial disease and resultant cardiac failure or as an evidence that the process is regressing with a correspondingly more favorable prognosis. Therefore, in kidney disease associated with pathological conditions in the choroid and retina we are dealing with an underlying condition which is responsible for both the nephritis and the retinopathy. In general, the kidney is no more to be held responsible for the retinal pathology than the eye condition is to be considered as causing the nephritis.

A typical case is cited by Kahler and Sallman: A patient 32 years old had had a hypertension since she was twenty-five. Her principal symptoms were headache and vertigo. She developed an impairment of vision and fundus examination

revealed a typical "retinitis albuminurica" with star figure in the macula and many areas of degeneration. There was no discoverable kidney abnormality. Six months later appeared the first traces of albuminuria, etc., and the patient developed a typical juvenile nephrosclerosis and died of uremia a few weeks later. A case like this emphasizes the fact that under these circumstances one must regard the hypertension as being the underlying factor of both the retinal affection and the kidney disease unless one wishes to assume that the retinal disease was an early symptom of impaired kidney function appearing before it was possible to determine such impairment with our present methods of examination. As has been mentioned, many forms of kidney disease are never associated with retinal changes. This is true of all forms which do not cause the interference with secretory activity which is characteristic of conditions causing a diffuse involvement of the glomeruli. The classic picture of hypertensive retinopathy is most commonly seen in the true diffuse glomerulonephritis, in the nephritis following scarlet fever, angina, colds and lead poisoning, in the kidney complications of pregnancy, etc. The cases occurring in the acute stage may make a complete recovery but when there is a secondary nephrosclerosis or when the disease, from the beginning, exhibits the symptom-complex of this form of nephritis (primary sclerosis) there is increasing liability that the retina will be involved. Retinal lesions are found in about 30 per cent of fatal cases of contracted kidney. Keith, Wagener and Kernohan differentiate between the retinal lesions in severe essential (malignant) hyperpiesis and those which occur in the hypertension associated with glomerulonephritis. Their experience is that in malignant hypertension the edema is less extensive and not so dense and that one less frequently sees the heavy "cotton wool" patches around the disc. They have found the disc to be hyperemic in essential hypertension in contrast to the pallor which they consider characteristic of the fundus picture in nephritis. Evidence of sclerotic changes in the arterioles is always present in malignant hyperpiesis and is infrequent in chronic nephritis.

The eye findings in the hypertensive toxemia of pregnancy show certain distinctive characteristics. Visible fundus anomalies are encountered in about one pregnancy out of three thousand and

usually appear in the second half of the pregnancy. Fundus pathology is found in the greater majority of gravid women in whom the blood-pressure is over 180. The picture is the classic one of hypertensive neuroretinopathy, only different from the ordinary form in that it is apt to be very severe and rapidly progressive in pregnancy and that there is a considerably greater tendency to the development of detachment of the retina. The prognosis of the retinal detachment in these cases is much better than that of detachment in general since spontaneous reattachment usually takes place, but the prognosis so far as the recovery of sight is concerned is, I think, not so favorable as it is generally supposed to be. In a series of fourteen cases of hypertensive retinopathy in pregnancy which I had an opportunity to follow some years ago, only two regained entirely normal vision. The prognosis is naturally more unfavorable in those patients in whom the kidney lesion and hyperpiesis existed prior to the pregnancy and those in whom the hypertension persists after the emptying of the uterus. In the early stages of eclampsia gravidarum one often sees cramp-like contractions of the vessels in the various sectors of the fundus. The location of these areas changes from time to time, finally becoming fairly constant. This is followed by the other characteristic fundus changes previously described.

The Pathologic Anatomy of Hypertensive Retinopathy

The earliest changes to occur under the influence of the hypertension are found in the retinal arterioles. In the slightly thickened walls in specimens stained with hematoxylin-Sedan little reddish points are found. They seem to be identical with those found in the brain in advanced cases of nephrosclerosis with hyperpiesis. They are due to a finely granular lipoid infiltration. There are localized thickenings in the nerve fiber layer of the retina and in section the appearance gives the impression of ganglion cells scattered through the layer. Schiek considers that these are varicose hypertrophies causing a spindle shaped swelling of individual fibers. Friedenwald, however, maintains that they are, in reality, large, swollen, necrotic wandering mononuclear cells. Quite characteristic of hypertensive retinopathy are homogeneous deposits in the deeper layers of finespun, fiberlike areas, the

"Faserkörbe" or fiberbaskets and the later formation of empty cystoid spaces. These changes give the impression of a foreign material forcing its way in between the nerve elements: that is, as though spaces opened up between the fibers and nuclei of the second neuron into which material flows and coagulates. It is probable that the radial arrangement of the glial network gives rise to the star figure arrangement in the macular region. Sections stained with osmic acid show the presence of lipoid material which is sometimes in free masses, sometimes as cell inclusions. These "Fettkörnchenzellen" are large, fat-laden phagocytes. They are an evidence of a perverted metabolism of the retinal cells and may occur in any condition characterized by a widespread destruction of retinal tissue.

Arteriosclerotic Retinopathy

In view of the fact that continued hypertension is invariably followed by changes in the vessel walls it is obvious that it may, in some cases, be impossible to differentiate rigidly between lesions due to the late effects of the hyperpiesis and those resulting from a concomitant arteriosclerosis. However, in spite of the frequency with which these conditions are associated, it is not unusual for hypertension to exist without any sign of arteriosclerosis and advanced arteriosclerotic changes may be observed in the presence of a blood pressure well within normal limits. The fundus in a more or less pure arteriosclerotic retinopathy shows certain distinctive characteristics. This naturally is most pronounced in the appearance of the blood-vessels, which show a quite characteristic irregularity of caliber, that is, a segmental contraction which is sometimes so pronounced as to give the vessel a beaded appearance. There may be a perivasculitis with pipestem sheathing of the arteries. In advanced cases the proliferation in the arterial walls may give rise to a complete obliteration of the vessel. The absence of edema of the disc and adjacent retina is one of the most important criteria in differentiating the arteriosclerotic from the hypertensive form of retinopathy. In the former there is no change in the retinal level. Unlike the "cotton wool" patches of the hypertension fundus the spots are "hard" in appearance, generally rather small in size and clear cut in outline without any shading off into the adjacent retina. These spots are usually found

along the course of the vessels and in the area around the disc. Retinal hemorrhages may be present but they are much less frequent in cases of pure sclerosis unassociated with hypertension and are quite rare in the senile form of arteriosclerotic fundus. Marked arteriosclerotic changes may exist in the fundus for years without any impairment of vision. Advanced sclerosis in one of the larger arteries, such as the central artery of the retina, may, in time, exert sufficient pressure on the accompanying vein to cause a thrombosis.

Pathology of Arteriosclerotic Retinopathy

The hyalin-lipoid form of vessel wall involvement has been described as occurring characteristically in hypertension. The other form of pri-

mary vascular disease is characterized by the proliferation of the intima and the development of atheromatous plaques. Later, fibrosis of the media and even of the adventitia is not uncommon. This condition probably sometimes leads later to the development of an obliterative endarteritis although the connection has not been clearly established.

In the various general dyscrasias and diseases of the blood the resultant involvement of the vessel walls frequently gives rise to retinal hemorrhages and to more or less characteristic fundus anomalies. To go into a detailed discussion of these conditions would carry one too far afield and would probably not properly come within the scope of this paper.

SOME NOTES ON THE HISTORY OF EPILEPSY

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OLIVER Wendell Holmes said, "If I wished to show a student the difficulties of getting at the truth from medical experience, I would give him the history of epilepsy to read."

The disease epilepsy was known among the ancient Greeks as the disease of Hercules,¹⁸ and also as the sacred disease. It has been suggested that its connection with Hercules alluded to the fact that some epileptic patients seem to possess Herculean strength. Some writers, on the other hand, hold that Hercules himself had the disease and that he had a fit while trying to conciliate the gods with some votive offering. Epilepsy was also called the sacred disease because it was thought that its victims were possessed by something greater than man. The dominance of this idea is exemplified by the theological coloring present in almost all of the ancient concepts of epilepsy. Most of the Latin names used to designate the malady indicate that the gods were suspected of having something to do with the cause and distribution of it, while others implicated evil spirits, and still others the moon. Years later lunar caustic (silver nitrate) was used in the treatment of epilepsy even to the point of argyria. This was done because silver is the color of the moon, and the moon caused madness, and prob-

ably is one of the earliest examples of the theory that *similia similibus curantur*.

Other names employed by the ancients to designate what we now call epilepsy were purely descriptive in character: *clonus epilepsia*, *hieranosis prehensio*, *morbus mensalis* (referring to the periodic occurrence of the fits), and numerous others. *Morbus comitialis* was widely used principally because the comitia or meetings of the Roman Senate were adjourned whenever any of the members had an epileptic fit. Later on, the disease was named after various saints who were thought to have something to do with the distribution of it. Thus, *Morbus Sancti Valentini* and *Morbus Sancti Viti* were widely used.

Many famous historical and literary characters were said to have epilepsy. Among these were Moses, Paracelsus, Cæsar, Moliere, St. Paul, Luther, Dante, Richelieu, Schumann, Byron, and Napoleon Bonaparte. From a study of ancient and biblical writings it is apparent that both grand mal and petit mal as well as Jacksonian epilepsy were recognized by the ancients.

In an earlier paper^a I stated that "in the early days of modern medicine almost every disease accompanied by convulsions was called epilepsy. Brain tumor, syphilis of the central nervous sys-

tem, uremia, various intoxications and convulsions due to congenital deformities of the brain all were included under the general term 'epilepsy.' As our medical knowledge and diagnostic acumen advanced, these entities gradually were sifted out from the general group until today the diagnosis of essential epilepsy is made only after all other possible causes for the convulsions have been excluded." The treatment of any disease is directed, whenever possible, toward the supposed cause of it. Consequently as the various beliefs concerning the cause of epilepsy changed through the ages, so changed the treatment.

As in so many other diseases, the early treatment of epilepsy was based on various demoniacal theories and superstitions. Hence it consisted mainly of incantations and various forms of purification. However, history tells us that trephining of the skull, which is one of the earliest of all surgical procedures, was employed by the ancients in the treatment of epilepsy. This operation was performed probably in the belief that the disease was due to the existence of evil spirits in the patients' head. Some of the substances used as medicine in those days were: castoreum, brain of the camel, heart of the hare, rennet from a seal, blood of a tortoise, crushed pigs' testicles in milk, testicles of old rams, and the luke-warm blood of slain gladiators. Von Storch wonders about the present-day administration of the liver of the cod, heart of the beef, pancreas of the pig, and fresh gall of the ox. Fasting and dehydration, which are used in our present day treatment of epilepsy, were also recommended before the birth of Christ.

In biblical writings various forms of improper conduct were given as the cause of epilepsy. For instance, "Who stands naked in front of a burning light will become epileptic, and who cohabits with a light lit will beget epileptic children." It has been suggested¹³ that rather than being promulgated as causes of epilepsy, these words were warnings against improper conduct as a threat against punishment. Other examples¹³ are, "When a child younger than one year is lying at the feet of a couple during coitus it will become epileptic"; also, "Coitus immediately after defecation . . . or after blood-letting has the same consequences for the children." These dicta probably were more in the sense of sanitary laws rather than actual beliefs as to the cause of epilepsy.

According to history Hippocrates was one of the first to believe that the disease was due to physical causes existing in the brain; but, before the new testament was written the world reverted again to the ancient conceptions, *i.e.*, that various gods and demons were the causative agents. It might be remarked that in modern times (gods and demons no longer existing) certain schools of thought, namely the psychoanalysts, ascribe the seizure to certain types of emotional possession and propose to cure them by more modern forms of incantation and purification such as "mental catharsis," "transference," "psychoanalysis," etc. In view of the most recent advances in our knowledge as to the real causes of the convulsive state, the philosophy behind this method of procedure seems to me somewhat archaic.

Galen held more to the mystical and humoral concepts of epilepsy although in some of his writings he did ascribe the seizures to the then popular notion that the fits were due to "a certain obstruction of the ventricles of the brain by which the animal spirit is prevented from flowing freely into the nerves of sense and motion." Apparently it was believed that the body contained four humors and three spirits. The humors were the pituitous, the melancholic, the blood and the yellow bile. Good health depended upon the proper temperature, mixture and circulation of these humors. The three spirits were "invisible and impalpable." They were the natural, the vital and the animal. The animal spirits were manufactured from the vital spirits in the heart, which in turn were manufactured from the natural spirits in the liver. The animal spirits were transmitted to the brain by the arteries, and then transmitted by the cerebellum, medulla spinalis, and peripheral nerves to the entire body. I believe that Hippocrates implicated the pituitous humor in the brain causing an obstruction of the ventricles and then convulsions. Be that as it may, this humoral concept apparently formed the transition stage between the mystical, demoniacal concepts and the more modern views based on scientific physiology. Galen's views colored medical thought for nearly 1,400 years. The fault, however, lies not with the dead Galen so much as with the men who perpetuated his ideas through the following centuries. In England as late as 1000 A.D., probably through the influence of the church, the divine concepts of epilepsy were still in vogue. At that time the disease was treated with what

were known as cramp rings.¹⁸ These were made from silver obtained at a communion service, or from coffin nails, or even pieces of navel string.

In the early and middle parts of the seventeenth century men began to take a more rational view of epilepsy. Thus, it was recognized that the aura was a part of and not the cause of the seizure. Observers began to classify the various forms of the disease on a more scientific basis, and one of our modern drugs, digitalis in the form of foxglove, was recommended as a treatment. Another drug, valerian, which was one of the earliest of all sedatives, was recommended in 1730 by Fabius Columna,¹⁵ who wrote, "It has been found by many . . . that the powdered root of valerian taken in a half-spoonful of wine, water, milk or other convenient fluid, once or twice according to the constitution and age of the patient will free him from epilepsy . . ." That medical thought was not yet entirely free from mystical influence may be seen in the following quotation from the same author: "The swallow-stone, which is found in the swallow's stomach at the beginning of the autumn in the first quarter of the moon, reduced to powder and given in any suitable liquid is highly praised against epilepsy. It may also be simply hung on the neck." The same author also recommends the use of the carp-stone, saying, "The carp stone shaped like a half-moon which it (the carp) has over his eyes is noted for that kind of apoplexy which is accompanied by convulsion and contraction of the muscles over the eyes." Among the remedies suggested at that time were oak mistletoe, peony root, the skull of a man who has suffered violent death (calcium?), deers' horn, and about four thousand different powders. A rather novel form of treatment was as follows: "Take a drachm of camphor, divide it into nine parts and give it to the patient to drink in his own urine, then bind on his navel a piece of toasted rye bread and let him sweat in a warm room in a bed well covered over."¹⁶

In 1705 a case of pituitary tumor with blindness and epileptiform convulsions was reported.¹⁸ Later on in the century, although the pathology of epilepsy was still imperfectly understood, its treatment was on a much more rational basis. The usual childhood convulsions were separated from the true epilepsies, and it was discovered that during the fit itself treatment should be conservative and protective. Epileptics were forbid-

den to use alcohol or to engage in strenuous exercise.

Continued progress along more scientific lines in the nineteenth century resulted in a modernization of many of the theories concerning epilepsy. The demoniacal, divine, mystical, and humoral concepts were gradually overshadowed by theories founded on known anatomical and physiological facts, although between the manifold types of epilepsy as we know them today there was as yet no extensive differentiation. A certain predisposition to epileptic seizures was recognized but the actual mechanics of the convulsion were unknown, and localization was frequently faulty.

In 1853 at a meeting of the Royal Medico-Chirurgical Society in London, Sir Charles Locock¹⁴ reported that fourteen months previously he had seen a patient who was afflicted with what he called hysterical epilepsy. All of the then known remedies had been tried but without avail. One year previous to Sir Charles' report the patient had been given potassium bromide in varying doses and at different intervals corresponding to her menstrual periods. Under this treatment the spells ceased altogether, and after the effect of bromide in epilepsy became more widely known numerous men became converted to its use. Its popularity grew rapidly and the usual over-enthusiasm developed, resulting in over-dosage which caused numerous cases of bromide delirium, toxic psychosis and stupor. It was even suggested that bromide of potassium might be used as an anesthetic in surgical operations, but this never proved successful. The *modus operandi* of bromide was not clearly understood and it was believed that the drug exerted an "alterative" effect similar to that of iodide of potash. Among other drugs recommended during the middle part of the nineteenth century¹⁴ were phosphorus, opium, belladonna, alcohol, and zinc.

The advance in knowledge of the disease epilepsy and of medical knowledge in general in the nineteenth century led to the formulation of countless theories as to the cause of epilepsy and to the propounding of innumerable forms of treatment. However, the old demoniacal and theological influences were now dead, and thought proceeded along lines that were more strictly anatomical and physiological. Cerebral localization and theories relative to the influence of changes in cerebral circulation were advanced. The medulla oblongata was implicated in the

causation of the convulsive state and this theory has its modern counterpart in the recent work of Davis and Pollock⁴ who in 1928 hypothecated a center in the medulla oblongata "from which a convulsion can be released following a suitable stimulus."

In 1860 Brown-Sequard¹ considered that epilepsy was due to cerebral anemia with an accumulation of venous blood containing an excess of carbon dioxide. This and other theories have recently been reiterated by Stanley Cobb² and other investigators.

In Radcliffe's book written in 1866 and containing his lectures on Epilepsy, Pain and Paralysis, the author states that the convulsions are connected with a state of *depressed* vital energy rather than with the contrary state of things. He based this belief on the fact that before a convulsion the patient becomes pale and his pulse grows feeble. Furthermore, respirations cease and therefore, reasoned Radcliffe, there must be a "corresponding degree of depression in every vital energy." He argued that the full, bounding pulse during a convulsion was a pulse of *black* blood, the pulse of suffocation, or "apnoeal" blood as he called it. Although some of his ideas appear to be rather vague and indefinite, it can be seen from a reading of his lectures that he associated the epileptic seizure with some circulatory change. He believed that the convulsion caused by an irritative cerebral lesion was due to vasomotor spasm induced by the irritation, and he also recognized uremia as one of several causes of convulsions.

Concerning treatment, Radcliffe opens his remarks with the statement, "There is reason to believe that the diet in many cases of chronic convulsive disorder ought to contain somewhat more than an average quantity of oily and fatty matters, and somewhat less than an average quantity of lean meat." Anybody familiar with the principles underlying the modern ketogenic diet will immediately experience a feeling of familiarity with the words. However, Radcliffe did not know the physiological chemistry underlying this diet but thought that lean meat induced a "semi-gouty condition of the blood" which in some way caused seizures. He ascribed the beneficial effect of potassium bromide to the belief that this salt corrected the semi-gouty condition of the blood. A diet high in fat was recommended because in many cases benefit had been derived through the administration of cod liver oil.

Radcliffe began to give cod liver oil and recommended high-fat diet in about 1866. His reason was that chemical analysis showed that "fatty matter is . . . an important ingredient of brain tissue." He reasoned that fatty matter might be as essential to the proper nutrition of nerve as flesh meat is to the proper nutrition of muscle. Since he believed that convulsion was the result of depressed vital energy, he argued that the energy could be replenished by a diet abundant in fat. While these views are not strictly in accord with our most modern teachings of ketogenesis, the clinical results at the time led to the continuance of the high-fat diet in epilepsy.

As in many other diseases, the ovaries were at one time implicated as a cause of epilepsy. In 1870 Echeverria⁵ wrote, "A female epileptic died at the hospital with all the symptoms of spinal apoplexy confirmed by autopsy. She had been subject to deranged menstruation. During her last days the right parotid and submaxillary glands became enlarged sympathetically, on inflammation of the right ovary, as manifested by the autopsy. This is the first anatomicopathological confirmation of this sympathy of the ovaries which I pointed out clinically some time ago." As treatment Echeverria advocated, among other things, "counter-irritation over the ovarian regions by painting the parts with blistering collodion and finally to move the bowels when necessary by an enema of tincture asafœtida and turpentine." This same author was also very enthusiastic about hypodermic injections of strychnine and his book contains reports of cases which apparently were marvellously benefited by this drug. Hypodermic injections of curare, and extract of conium which was supposed to "diminish the irritability of the spinal cord and have a special narcotic effect on the pneumogastric nerve," were also highly recommended.

In 1881, Sir William Gowers⁷ published his epochal work on epilepsy, which, from a clinical standpoint, is still a masterpiece. The physiological principles expressed by him and his clinical observations have stood the test of time. He differentiated between organic or symptomatic epilepsy, and true or idiopathic epilepsy; he recognized the tonic and the clonic phases of the seizure; he stated that "a single convulsion does not constitute epilepsy"; and he recognized the hereditary tendency of the disease. All of these observations still are regarded as being accurate, and probably the only additions that have been

made to Gower's work have been along physiochemical lines.

In 1888, J. Leonard Corning³ divided the principal methods of treatment of epilepsy into three groups: surgical, medical and dietetic. Under surgical procedures he mentioned trephining to remove scars and the elevation of depressed fractures. He stated that the percentage of these cases was small although the results were good. Apparently ovariectomy enjoyed a popularity that was only brief. Under medicinal measures Corning listed valerian, chloral, wormwood, hyoscyamus, belladonna, oxide of zinc, silver nitrate, chloroform, ether and amyl nitrate. He stated that since 1875 bromide had become very fashionable. Dietetic management is referred to very little. In status epilepticus continuous carotid compression was advised, and Corning devised a clamp-like instrument which patients were directed to wear for days and weeks at a time in order to prevent seizures.

In our present century probably the earliest important contribution to the treatment of epilepsy was the introduction of phenobarbital (luminal). This drug has now supplanted bromides and the others almost entirely, although Ulrich¹⁷ in Switzerland still uses bromides in conjunction with a restricted chloride intake. There apparently is an inversely proportional relationship between the blood chloride and the blood bromide. Ulrich has worked out this relationship and has plotted curves by which one can determine how much bromide by mouth is required to maintain a constant bromide level in the blood in the presence of varying amounts of chloride in the diet. Ulrich now keeps the chloride intake low and constant and finds that a minimal amount of bromide will control the seizure and not produce bromism. I was very much impressed by the clear skin and alert expression of the large number of patients whose convulsions were held in abeyance by the daily administration of a soup made from a cube which, in addition to an extract of various ingredients of soup, contained a bromide and sodium chloride in the proper proportion (Sedabrol). The patients' diets were otherwise salt-free.

The late Doctor Julius Grinker⁸ was the first one in America to use phenobarbital (luminal) in the treatment of epilepsy, and in 1920 he published an article reporting his experiences with this drug, which he began using in 1913. He stated, however, that luminal was used first in

Germany by A. Hauptman, who published his results in the *Muenchner Medizinische Wochenschrift* in 1912. Although phenobarbital is almost invariably given by mouth, other routes of administration have been tried. In 1922 Tomesco and Constantinesco¹⁰ injected sodium luminal into the subarachnoid space, and in 1926 Ayola¹⁰ injected the drug into the cisterna magna. However, these procedures resulted in so much meningeal irritation that they are not recommended by these authors. Sodium luminal can be used intravenously with good effect in status epilepticus. I have combined this form of administration with spinal drainage in a sufficient number of cases to lead me to adopt it as a routine procedure in this condition.

From the standpoint of diet, Wilder's¹⁹ ketogenic diet is probably the most important contribution of the century. Wilder devised a diet on which it is possible to maintain ketosis for a considerable length of time. At first it was thought that the benefits were due to the anesthetic effect of the acetone bodies on the cerebral cortex. Later on, dehydration resulting from the acidosis was held responsible for the decrease in seizures, and more recently it has been found that the acetone bodies have anti-convulsant properties similar to those of phenobarbital but without the soporific effect. As yet, however, there is no uniform agreement on the *modus operandi* of the ketogenic diet.

In the past few years the physio-chemical approach to the riddle of epilepsy has been emphasized. Disturbances of the cellular physiology of the brain have been suspected and many investigations carried out along this line. In 1929 Fay⁶ concluded that in a certain number of cases of epilepsy there is an excessive accumulation of fluid over the cerebral cortex, *i.e.*, a chronic external hydrocephalus which results in cortical atrophy. He based these conclusions on encephalographic studies together with certain others of a microscopic nature in fifty-nine patients suffering from convulsions. He advocated marked restriction of the fluid intake of epileptics, and in a large series so treated secured either disappearance or marked decrease in the frequency and severity of the fits. We now are advising fluid restriction in practically all of our epileptics.

More recent workers have favored the physiochemical rather than the purely mechanical explanation of the beneficial effects of fluid restriction in epilepsy. McQuarrie¹² and his associates

suggest that in epilepsy there is a disturbance in equilibrium between the extracellular and intracellular fluids in the brain and attributes this disturbance to a change in the permeability of the cell membrane permitting hydration and an alteration in the colloidal state of the intracellular proteins. Along with this condition there also is a disturbed mineral balance, particularly with regard to the potassium and sodium ratio. During the convulsive state there is an excess of potassium in the urine as compared to the amount of sodium. McQuarrie has shown that this potassium probably comes from the nerve cell itself, the cell membrane no longer acting as a barrier because of its altered permeability and in that way permitting a "leakage" of potassium ions.

Because epileptic children are benefited by a ketogenic diet or by fasting, *i.e.*, procedures which are known to affect the level of the various blood lipids, McQuarrie¹¹ and his group also studied the blood lipids in epileptic children and found that, while there was no significant change in the cholesterol values, there was a definite lowering of the mean value for lecithin and a raising of the total fatty acid values. Furthermore, he found that in epileptics there was a greater variability of the phospholipid and total fatty acid values. Inasmuch as these substances are important constituents of the nerve cell membranes, these findings are significant in view of the presumed alteration in the permeability of the membranes.

McQuarrie et al. have also performed clinical experiments which substantiate Fay's original observations on the effect of fluid restriction in epilepsy. They induced changes in the state of hydration of the body by various procedures, and found that the establishment of a positive water balance was regularly followed in epileptic children by convulsive seizures, except when the patient was receiving anti-convulsant drugs (phenobarbital). If water retention was prevented by active diuresis or catharsis, high water intake did not necessarily produce convulsions.

From a consideration of the foregoing review, which has necessarily been sketchy, one is impressed by the kaleidoscopic panorama that epilepsy presents when viewed through the centuries of man's progress. Between the time of Hippocrates and that of Sir William Gowers a great many changes occurred in ideas, both as to the causes of epilepsy and also its treatment. I feel that Gowers sounded the beginning of modern

thought on epilepsy when in 1881 he wrote, "Epilepsy is a disease of gray matter and it has not any uniform seat. It is a disease of tissue, not of structure." Compare this statement made by Lennox and Cobb¹⁰ a half century later! "There is no constant anatomical lesion in epilepsy, and only a minority of patients with extensive cerebral pathology have fits. We are forced, then, to postulate some unknown constitutional element." Probably this element is the altered permeability of the cell membrane!

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HOW ONE LEARNS TO WRITE*

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I KNOW it doesn't do very much good to talk to you about the general principles governing writing because most of you need and want practical advice. I feel I am very much in the position of the preacher as described by Dean Swift in his *Argument Against Abolishing Christianity*. "It is a very absurd and ridiculous custom that a set of men should be suffered, much less employed and hired, to bawl one day in seven against the methods which are the constant practice of all men alive on the other six." That is exactly what I am doing—"bawling" against the methods you all employ during the other eleven months, thirty days, and twenty-three and one-half hours of the year.

If I had had longer notice or an invitation further in advance of this meeting I should have brought in some clinical material. On Tuesday, Dr. Olson asked me if I would talk to you tonight; and today is Thursday. I immediately asked men who I knew wrote medical papers if they would turn over to me some unpublished manuscripts which I could use for illustrative material. For some strange reason they all refused.

What I have to say is not intended to discourage any of you from attempting to write. Writing is, for anybody, even for a professional who writes most of the time—except the newspaperman who falls into a routine—ordinarily a very difficult thing. The reason men who write seldom write no better than they do is that they do not realize what a terrifically hard job writing is. As Dr. Bulkley has told you, I have written several books; I write a good many articles, but I find that the longer I write the more critical I am of the result. A great deal of the bad writing that is done may be explained by the fact that men do not realize how much intense effort and how much prolonged application is really required for the production of any kind of finished product.

The first requisite, if anyone is going to write, is that he shall have something to say. Most

people think that Professors of English are rather "old-maidish," that they are so concerned with the proper use of words, the proper placing of commas, etc., that they forget all about ideas. I am somewhat heretical among teachers of English because I have always insisted that the first and most important element in composition is the idea. I should much rather listen to a man no matter how illiterate he may be, if he is intelligent and has an idea, than to one who conforms to all the rules of English, who has a beautiful voice but who has not an idea in his head. I should rather read a poorly written book, provided it contains food for thought, than a beautifully written one that has no appeal to the intelligence.

When Dr. Olson asked me to talk to you I supposed that I should not have to mention at all this fundamental necessity of ideas, because I assumed that anyone who sat down to write an article for a medical journal did so because he was convinced that he had something to say. But immediately after Dr. Olson asked me on Tuesday to talk to you, I went over to a dinner club to which I belong. There were two or three surgeons there, and I said: "I have a very difficult job before me and one which, if I had had time to reflect, I should never have undertaken. I am going to talk to the Minneapolis Surgical Society about writing. What shall I tell them?" One man said: "Tell them to have an idea. That is the trouble with most of their articles, they haven't any ideas." Later, another man came in, a man who has a great deal to do with graduate work in Medicine. He said: "Tell them to have a point and to get to it some time."

Now, gentlemen, nobody (particularly a Professor of English) can furnish you with ideas, but there is one thing I want to emphasize in the beginning so that as I go on to talk about the other things of which I am competent to speak, namely, the form and the order of the ideas you may have, you shall not lose sight of this important fact and get a wrong impression of what I consider to be good writing. Personally, I

*Read before the Minneapolis Surgical Society, March 1, 1934.

should rather know an untrained man of intelligence, good character and real kindness than a man whose manners are perfect but who is an unintelligent nonentity. The one may offend by his bad manners but the other bores me. Personally, I would much rather be offended than bored. When I pick up an article which offends me, provided there is something real there, I go on and read it through, though I deplore the fact that the man has not had the necessary education and training, or, what I think is more often the case, has been unwilling to devote the labor and the time necessary to put the manuscript into shape.

No good writer that I know writes easily. Writing is not done without effort. That is why so many people say they write with their own blood. Five hundred words a day of a finished product is rather speedy composition. Those of you who sit down and dash off an article in a half day or an evening have not written an article; you have only made the first rough draft of it.

As I have said, I was unable to get hold of a manuscript to bring here in order that I might go over it with you, pointing out what I considered to be its virtues, its defects and the methods by which it might be improved. Lacking such material, I asked Dr. Olson for some copies of medical journals. The first one he handed me was an old number of MINNESOTA MEDICINE, the contents of which I hope most of you have forgotten if you ever read it. I opened it to the "Table of Contents" and then turned to the one article which I thought I might be able to understand, "The Status of Tinted Lenses," by a Minneapolis ophthalmologist.

You can see therefore that I have not chosen this article as a horrible example. In many ways it is well written. So far as my limited knowledge of medicine permits me to judge, I should say that it is distinctly above the average. But it does exemplify what about 90 per cent of all writing represents; namely, the first draft, and merely the first draft, of a finished product.

The writer of this article has an idea that he wishes to present; namely, that tinted lenses are being prescribed in a haphazard manner and that in many cases this use is detrimental rather than beneficial. That the article is timely is proved by the fact that a Minneapolis supply house has a full page advertisement of tinted lenses in the

front of this same issue. The chief defect of the paper is that the writer has failed to work out a definite logical plan for the presentation of his ideas before writing or has failed to revise in accordance with such a plan after his first draft.

After reading the article several times I have elicited the following as the principal points which he wished to bring out:

1. Tinted lenses are being prescribed in an aimless and indiscriminating manner.

2. In most cases these tinted lenses are unnecessary, because nature furnishes protection against excessive ultra-violet rays and excessive heat.

3. The use of these tinted lenses may be harmful because they interfere with the natural process of adaptation of the eyes to varying conditions of light.

4. The ophthalmologist may be justified in prescribing them for people subjected to unusual conditions such as high altitude, where sunlight is intense, or snowfields or water where there is a great deal of reflected light.

5. Experiments have been made to determine the color of lenses which is most efficient in any given set of conditions, so that haphazard prescription is unjustified.

6. A summary of these points and the conclusions drawn from them.

This is a logical and orderly summary of the article—at least from a layman's point of view. The trouble is that the writer has taken these points up more or less together, that he does not finish with one idea before he passes on to the next and hence has to return to it again. Instead of orderly progress in a fairly straight line toward some definite preconceived goal, the path of thought is like that of a hunting dog quartering a field.

Many people are of course unable to think out a subject and make a plan before beginning the actual process of writing. They have to think on paper. In my own case, the first draft of anything I write is merely a preliminary thinking of the subject to discover for myself what ideas I may have on it. I regard this first draft as so tentative that I can scarcely write except with a pencil. Ink has something of the fixity and permanency of print, and does not permit as easily of erasures and insertions.

The writer of the article in question has thought out his subject, he has got his ideas down

on paper. This is the point at which *composition* in the true sense of the word should begin. He should have gone through his paper, playing with his ideas as he would with the pieces of a cross-word puzzle. The study of an unfinished manuscript to see how it can be re-arranged, what new combinations can be effected, what needs elaboration and emphasis, what toning down can be made is a fascinating intellectual pastime. My own first draft of a paper may be a badly scrambled mass of ideas. I renumber the pages, renumber the paragraphs, renumber the sentences within the paragraphs, turn the sentences inside out and other end to until I get something that at least approximates what I wish to say.

This is the only practical method I know about of teaching people to write. Most people consider anything that they have once written to be as fixed, unalterable, unyielding, as though their ideas had been cast in iron. They do not know what to do with it except to throw it into the waste basket and then begin all over again. Instead of being master of their own ideas, they are mastered by them. They should work with their material as a sculptor does with his model, conscious that it is plastic and susceptible of almost infinite possibilities of change until it is cast in iron or bronze. No statement is unalterable or irrevocable until it appears in print.

Let us suppose that by the methods I have suggested you have worked out some orderly plan for your article. Any one with a logical mind can work out some reasonable outline. More than almost any other men I know, surgeons with their knowledge of anatomy and their constant training in systematic procedure in operations should be expected instinctively to think and write in a coherent sequence. Now you know what it is that you intended to say, or toward which you were instinctively groping in your thinking out of your subject on paper.

The next step is to read over what you have written and find out whether or not you have said it. The result is most often a vague feeling of dissatisfaction. You know that you haven't done the job you set out to do, but you cannot find out exactly why not. You don't know what to do to improve what lies before you. What I would advise then is that you make a summary of your own article. Try to sum up each paragraph in a single sentence. If your article contains twenty paragraphs, you will have the same

number of sentences. Read them over and see if they proceed in any definite sequence and if taken together they make sense. This is one of the simplest devices I know and one which anyone can apply to any composition, provided—and, of course, here is the catch—it is written in paragraphs.

What is a paragraph? Most writers think they have to break up a page about every so often, just as every so often they have to throw in a few commas or periods. They know it is done, and the manuscript looks better if it is done. Consequently, they put a break on the page and call the space between the breaks a paragraph. A paragraph is nothing more than an emphatic mark of punctuation, indicating to the reader that a group of sentences is to be taken collectively as the development of a single idea. You are supposed to have the development of one idea and only one idea in a paragraph. In a well written article or book, for example, you can go through and read the first and last sentences of each paragraph and get a complete summary of it. That is what a paragraph is; the development or enlargement of a single idea. Let me read a paragraph from this article, or a part of one:

"The self-evident fact that colored lenses cut down the intensity or brightness of light of necessity raises the question whether this decrease of luminosity is harmful or beneficial."

The rest of the paragraph is a quotation from some authority, and is summed up in this way: "The effect of increased intensity is to speed up clear seeing, lessen fatigue, and prevent ocular discomforts." The first sentence of the paragraph leads you to believe there is a very important question, whether tinted lenses are harmful or beneficial. Apparently there isn't any question at all; or at least it is entirely one-sided.

He goes on, developing his idea very clearly until he gets about half way through the next paragraph:

"In myopes and hyperopes there is an abnormal relation for accommodation and convergence. In these the strain of attempting to see clearly is much reduced by high intensities of light. It is not, then, the brightness of light which produces the asthenopic symptoms, but it is the faulty lighting arrangements, which cause a faulty distribution of light. Instead of lowering the brightness, more attention must be paid toward effecting a proper distribution. This entails, first, the elimination of unevenness of illumination, which produces

glaring and brilliant surfaces; second, the proper diffusion of light; third, careful attention to the angle of incidence; and, fourth, elimination of high brilliancies in the field of view."

The symptoms he brings in here have never been mentioned at all. It is entirely a new aspect of the subject that there are people who have asthenopic symptoms under very bright light; that these are not caused by the light itself but by improper illumination and this must be taken care of. He had jumbled up into one paragraph three ideas, and in order to get the ideas you have to do the work which he should have done for you. This is bad writing, not because the writer has nothing to say, but because he has been unwilling to do the necessary amount of labor to make good writing out of it. I have a number of illustrations from this one issue of MINNESOTA MEDICINE of this sort of thing.

Suppose you have the outline, suppose you have the paragraphs, the next thing is to consider the individual sentences. The type of a sentence that a person writes is one that sounds all right to him, and he lets it go. For example, here is one of mine which has been in print for about seven years.

"Although these two seem to have little direct connection with each other, they are but two aspects of one movement, the democratization of literature, first through a great increase in the reading public by an extension downwards that brought in an entirely new class of readers, second through an extension of the subject matter to bring it to the level of the experience and interests of the new readers."

I read it on Wednesday and said: "What does it mean?" There is no trouble with the grammar, but it is just a lot of words thrown together. It doesn't mean anything.

I am sure Dr. Olson won't object if I read a sentence from the program for this evening:

"Special Notice. Due to the quarantine of the Minneapolis General Hospital the following program will supplant the notice just received."

What does this mean? "Due to the quarantine the following program . . ." The program was not caused by the quarantine, or at least I hope it wasn't. That sort of slip occurs constantly. What is the meaning of the word *due*? "*Due to* prolonged exposure, the patient suffered such and such a disease." Gentlemen, as doctors, you know that the patient was not due to exposure; he was

due to certain inadvertences on the part of his parents.

After you have gone through the article, have made the plan for its organization, have scrutinized the paragraphs, you have to go through it sentence by sentence and see if each sentence means something. Here is a sentence from this article:

"It is true that this radiation in sufficient concentration has a decided injurious effect upon certain structures of the eye, as has been amply proved by clinical observation and experiment, and even in the concentration present in the solar radiation a few isolated instances of injury have been reported, as in the case described by Syme where a woman developed an erythematous rash and injection of her eyes on a bright summer day (Duke Elder explains this by a sensitizer in the blood); but for the vast majority, nature has provided abundant protection against the ultraviolet ray."

Do you know what that means? You would not if you had the manuscript before you.

I will turn to the address of the President of the Minnesota Medical Association and read one of his sentences. He is talking about the charges brought against the medical profession. Here is one of his sentences:

"Reference is made to the group whose earnings do not exceed \$2,500 per annum and does not consider the indigent."

What does it mean? "Reference, . . . does not consider the indigent." When you get right down to basic considerations, good writing is dependent on clear thinking. You don't need to know anything about grammar, and you don't need to know anything about punctuation. Most bad writing is the result of muddleheadedness. It is bad thinking. For most people writing is thinking on paper; and they do not take the time to make a careful analysis, and to revise their work as good writers do.

Here is another sentence:

"Their destructive criticism succeeded in working a great deal of serious inconvenience to the business methods of that time, but the ultimate result was to popularize still greater business combinations and the muck-raker was thereby out of a job."

You have got to pause after the word "combinations," otherwise you get a diametrically opposite idea from that intended by the writer. It is only a slovenly writer who misleads you in this way.

Here is no question of grammar but of common sense.

I could go on indefinitely talking to you about things of this sort, but I want to close by pointing out to you what seem to me to be the most important reasons most of us are not better writers than we are. First, writing is hard work. I dread it. I really suffer when I have to write a book. I go to my desk and sit down, and I labor as I never labor at any other time in my life. It is hard, and only by hard, persistent application is anything produced that gives any sense of satisfaction at all. Because it is such hard work most of us shirk it, avoid it. We do not write any oftener than we have to; only when we are compelled to write, do we write.

The second reason we are such bad writers is the one I have already mentioned; we regard anything put down on paper by pen or anything else, as something cast, something we cannot do anything with except re-cast. The first form of anything should be more or less tentative. Get the idea of playing with a sentence, turning it inside out, putting what is last first, or making the middle the beginning, what is the principal clause of it, the subordinate clause. See how many different ways you can say the same thing until you find one way which is the most effective. That is real practice in the art of writing.

The third reason is that we all fall into more or less stereotyped habits of expression. In our dictation, we say—"Yours of the 10th received"—and so on. We do not make any effort to put originality into our speech, into our dictation, or even into the writing of our personal letters. We avoid, as far as possible, all of the opportunities

presented to us in ordinary conversation, in the writing of personal letters, in the dictation of business letters, to improve ourselves in this, the most important of all our faculties.

I want to leave with you in parting Boswell's account of the manner in which Johnson acquired that facility in and that mastery of the English language for which he became famous. Dr. Johnson is an outstanding exception to nearly everything that I have said. Yet I consider the example which he set as the one which you should bear constantly in mind.

"Posterity will be astonished when they are told, upon the authority of Johnson himself, that many of these discourses, which we should suppose had been laboured with all the slow attention of literary leisure, were written in haste as the moment pressed, without even being read over by him before they were printed. It can be accounted for only in this way; that by reading and meditation, and a very close inspection of life, he had accumulated a great fund of miscellaneous knowledge, which, by a peculiar promptitude of mind, was ever ready at his call, and which he had constantly accustomed himself to clothe in the most apt and energetic expression. Sir Joshua Reynolds once asked him by what means he had attained his extraordinary accuracy and flow of language. He told him that he had early laid it down as a fixed rule to do his best on every occasion, and in every company: to impart whatever he knew in the most forcible language he could put it in; and that by constant practice, and never suffering any careless expressions to escape him, or attempting to deliver his thoughts without arranging them in the clearest manner, it became habitual to him. . . ."

When we sit down to write we are doing something that is wholly foreign to our ordinary habits. We have got to get away from that if we are ever going to learn to write.

INTRAVENOUS USE OF BARBITAL COMPOUNDS (II).

The Council on Pharmacy and Chemistry reports that in 1931 it decided on definite limitations for the intravenous use of barbitol compounds for induction of anesthesia and sponsored the following statement: "Their intravenous use should be limited for the present to conditions in which oral administration is not feasible either because the patient is unconscious, as in cerebral hemorrhage, eclampsia, or status epilepticus, or because he resists, as in delirium, or because a very prompt action is imperative, as in convulsion from local anesthesia." In the consideration of sodium amytal and the brands of pentobarbital sodium, the Council recognized that these drugs might be administered intravenously in the conditions mentioned in its report and laid down certain stipulations with regard to propaganda for their intravenous use. In the recent

consideration of Pernoston, a barbituric acid derivative marketed only in injectable form, the question was raised as to whether or not in the light of accumulated experience it was desirable to relax the limitations which the Council had placed on the intravenous use of barbitol compounds. A questionnaire was sent to a selected list of surgeons, anesthetists and others asking whether they considered that the time had arrived when the Council should agree to the advertising of preparations of soluble barbiturates for intravenous injection for induction of anesthesia. The Council has given careful consideration to the replies to the questionnaire, and it believes that the evidence overwhelmingly sustains its previous conclusion concerning the limitations for the use of the soluble barbiturates in the induction of anesthesia. The Council therefore has reaffirmed its previous decision with reference to the advertising of these substances. (Jour. A. M. A., July 15, 1933, p. 208.)

PROGRESS IN THE TREATMENT OF CARCINOMA OF THE STOMACH*

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THE introductory paragraphs in a recent monograph on cancer of the stomach by Balfour and Gray forcibly state the importance of early recognition of this condition: "The seriousness of cancer of the stomach cannot be overstated, since in the majority of cases encountered by the surgeon the disease is too far advanced to permit complete removal of the involved tissue; every effort should be made to detect the lesion while it may still be possible to remove it." It cannot be too strongly emphasized that such removal may bring about temporary or permanent results that are unexpected. Even a definite percentage of cures will follow.

During the past year the progress which has been made in the treatment of carcinoma of the stomach can be attributed to, first, the increasing efficiency with which the competent roentgenologist can identify even the smallest gastric lesion, and second, extension of the field of operability to include extensive carcinomas of the stomach, which heretofore might have been regarded as being on the borderline of operability, or even roentgenographically inoperable or unremovable.

The value of roentgenographic examination in cases of early carcinoma of the stomach was strikingly illustrated in two cases which recently came under my observation. In the first case, the presence of a small carcinomatous, ulcerating lesion, measuring 1.9 by 1.7 cm., was detected by the roentgenologist, was found at operation, and was successfully removed by gastric resection. The pathologist confirmed the diagnosis of malignancy. In the second case, that of a man aged thirty-two years, the roentgenologist had made a pre-operative diagnosis of a small, ulcerating, malignant lesion of the lesser curvature of the stomach. At operation, with the lesion between my exploring fingers, I felt that it was the result of an inflammatory reaction. The distal half of the stomach, and the duodenum, were removed because of uncertainty concerning the nature of the lesion, and the pathologist reported it to be

an adenocarcinoma, graded 2. Last week I operated on a patient who had a small, recurring ulcer of the lesser curvature of the stomach, two years after reported local excision of a gastric ulcer. Recurrence of the symptoms associated with pylorospasm had occurred. The roentgenologist reported a gastric ulcer with a small crater. At operation, the lesion appeared grossly to be a benign gastric ulcer, with a round, smooth crater approximately 1 cm. in diameter. Because of the history of recurring ulcer and the associated pylorospasm, gastric resection was performed, cutting well beyond the lesion, using the Billroth I-Haberer anastomosis between the stomach and the second portion of the duodenum to restore continuity. Although, on gross examination, the lesion appeared to be benign, a few minutes later a report of microscopic examination was that the lesion was a carcinoma.

In the first two of these cases the roentgenologist was correct in his declaration that the lesions were malignant, whereas in the third case the possibility of the lesion being malignant was not suspected until microscopic examination had revealed its presence. I believe the statement is justified that the report of a malignant lesion of the stomach, made by a competent roentgenologist, is almost certain to be accurate, but the report of a gastric ulcer made by a roentgenologist or even by a surgeon who actually sees the tissue at the time of operation, does not exclude the possibility that the lesion may be carcinomatous.

I should like to emphasize the point that small, ulcerating lesions of the stomach may be carcinomas. McVicar called attention, several years ago, to the fact that an ulcerating lesion of the stomach which disappears following a course of medical treatment cannot always be assumed to be benign, for he found that many patients with ulcerating lesions of the stomach may respond temporarily to medical treatment even when the process is malignant. To consider such disappearance of a lesion as a criterion that it is benign, may cause delay in attacking the lesion surgically, and may allow an operable lesion to

*From the Division of Surgery, The Mayo Clinic, Rochester, Minnesota. Read before the Inter-State Postgraduate Medical Association of North America, Cleveland, Ohio, October 16 to 21, 1933.

proceed to inoperability. There is no doubt that medical treatment of many benign gastric ulcers by internists skilled in treatment of gastro-intestinal disease is worthy of trial for certain types of gastric ulcer, particularly when acute and the patient is young. This treatment should be attempted only when the patient can be kept under observation for several months. It should be emphasized that the decision to treat such a person by medical measures carries a great responsibility, for if the lesion is malignant by the time it is found to respond unsatisfactorily to medical treatment, sufficient time may have elapsed for it to have become unremovable. I vividly recall one patient with a gastric ulcer who was being treated medically. Pain was relieved, blood disappeared from the stools, and the niche disappeared on roentgenologic examination. Ten months later, however, symptoms reappeared. The roentgenogram revealed the lesion, exploration was made, and an extensive inoperable malignant lesion was found from which the patient died a few months later.

Curability of Carcinoma of the Stomach

A recent study by Gray, of a series of 373 patients who had undergone resection for carcinoma of the stomach in The Mayo Clinic, disclosed that the three most important factors in decreasing the possibility of a long postoperative life are lymphatic involvement, serosal involvement and a tumor of a high grade of malignancy. Further, the incidence of lymphatic involvement increased in direct proportion to the increase in the severity of the malignant process, as indicated by Broders' index of malignancy. This study serves to explain the fact that in 1,000 consecutive cases of carcinoma of the stomach reported by Balfour, for which operation was performed at the clinic, 52 per cent of the patients whose lymph nodes were not involved at the time of operation were alive at the end of three years. Of those whose lymph nodes were involved, only 19 per cent survived that length of time. This statement should not be construed, however, to mean that the presence of involved lymph nodes is a contraindication to operation, for enlargement of the lymph nodes along the curvatures of the stomach does not necessarily mean involvement by carcinoma, for microscopic examination of many of these lymph nodes will show them to be enlarged from inflammation, and to con-

tain no cells of carcinoma. In either event, complete removal of all enlarged lymph nodes in the gastrohepatic omentum along the lesser curvature of the stomach, as well as those along the greater curvature of the stomach at the time the resection is done, is the advisable procedure.

If further progress is to be made, therefore, in securing a larger proportion of three and five year cures in cases of carcinoma of the stomach, every effort must be made to recognize the presence of gastric lesions in their earliest stages. Although the symptoms, signs, and course of the disease are dependent in large measure on the situation, extent, and size of the growth, it might be said in general that the most important and most frequently occurring symptom is persistent dyspeptic discomfort. In some cases symptoms suggestive of an ulcer may have been present for years; later, and this is suggestive of malignant degeneration, the symptoms may change in character. One such change may be that methods which previously had been effectual against pain, fail. A relatively small number of patients have mild, irregular indigestion, sometimes the result of a diseased appendix or gallbladder, and the change of symptoms that might be suggestive of malignant degeneration is so insidious that the patient is without knowledge of the change. The presence of gastric lesions producing obstruction and hemorrhage is readily recognized.

Since carcinoma of the stomach can be detected by a competent roentgenologist in 95 per cent of all cases it should be emphasized that such an examination of the stomach of patients forty years of age or more, who have indeterminate dyspepsia, is a most important procedure. It should never be omitted in any suspicious case.

Reference has been made to the difficulty of determining the exact nature, before microscopic examination, of an ulcerating lesion of the stomach. In addition to carcinoma and ulcer of the stomach, relatively few other gastric lesions occur with any degree of frequency. They are gastric polyps, lymphosarcomas, and syphilitic lesions of the stomach. All of these lesions occur in the proportion of less than 1:100 in comparison with carcinomas. Masson found that, at the clinic, the proportion of sarcomas to carcinomas was 1:159, whereas gastric polyps occurred with even less comparative frequency. The malignant potentialities of all polyps of the

stomach parallel those of polyps of the colon. Therefore, the periphery of a polyp, as well as its pedicle, should be carefully examined at the time of its removal to ascertain the presence or absence of malignant cells. In a pathologic study of five recent cases in which gastric polyps had been removed, McRoberts found that in four of the polyps there was secondary cytoplasmia at the periphery. In larger gastric polyps, the probability of malignant degeneration makes partial gastrectomy advisable.

While considering gastric polyps, attention should be directed to the fact that a large polypoid tumor of the stomach may be attached by a narrow pedicle, and yet, on roentgenologic examination, may so displace the barium as to lead to the impression that an extensive, malignant lesion is present. If the pedicle is short and the polyp lies in the upper part of the stomach, the erroneous conclusion is reached that an inoperable lesion is present, whereas easy access to the tumor can be gained by the transgastric approach. Further tending to obscure the diagnosis is the fact that in almost all cases of gastric polyp, when complicated by other gastric lesions, free hydrochloric acid is not found in the gastric content.

Surgical Treatment

It has been the custom at the clinic to advise exploration in cases of carcinoma of the stomach, unless unremovable, metastatic growths have been proved to exist. The rationale of such a decision rests on the basis that occasionally roentgenograms will give evidence that a lesion is of greater extent than it really is, and frequently the stomach is found to be unusually movable, a circumstance which makes any localized gastric carcinoma suitable for removal. Occasionally a diseased and distended gallbladder, or distention of the splenic flexure of the colon from gas, or the presence of other lesions in adjacent viscera, such as pancreatic cysts, may so interfere with the neuromuscular activity of the stomach that apparent defects in outline, suggestive of carcinoma, manifest themselves. When such disturbances involve the upper portion of the stomach, they may lead to the erroneous interpretation that the lesion is inoperable.

In the last few years, we have been able to remove an increased number of extensive malignant lesions of the stomach. This has been par-

ticularly due to the fact that a patient is always given the benefits of exploration and removal of the malignant gastric lesion if it is feasible to do so. In the last three years total gastrectomy has been performed at the clinic in seven cases. In November, 1932, two of these seven patients were living and well more than two years after operation, and one more than one year after operation. That such an operative procedure could be carried out in suitable cases with great benefit to the patient has led to the impression that gastric lesions should be considered removable unless they have invaded adjacent structures and thus could not be removed in their entirety. In many cases in which the lesion at first appears to be incapable of removal because of the extent of the growth, or because of its attachment to the mesocolon or capsule of the pancreas or liver, it is found that after the freeing of adhesions and the separation of the lesion from the structures, the growth can be removed. In other cases, particularly if the tumor is large, the uninvolved portion of the stomach may be thickened and give the appearance of involvement, although thickening may be only the result of gastritis adjacent to the lesion. Balfour has called attention to the fact that a gastric lesion examined while the patient is straining under light anesthesia may appear unremovable, but under deep anesthesia the lesion may be readily accessible.

The influence of age on operability.—On previous occasions, I have emphasized the fact that in the consideration of operability of any lesion, advanced age of the patient is no detriment to successful completion of an operative procedure, regardless of its magnitude. In other words, everything else being equal, it is not the patient's age but the patient's general condition which determines the operative risk of a given surgical procedure. The ability of elderly patients to withstand such procedures as extensive gastric resection is exemplified by one patient, aged sixty-nine years, on whom I performed successful total gastrectomy more than two years ago, and who was living and well at the age of seventy-two years. I have successfully performed extensive gastric resections for malignant lesions in the lower and middle thirds of the stomachs of many patients who were more than seventy-five years of age, and of one, recently, who was aged eighty years. In many such cases the value of a few days of preparation in the hospital, before the

operation, has been considerable. The impression is that gastric carcinoma of elderly patients manifests its presence when the growth is in a fairly early stage, but this impression may be accounted for by the fact that late in life growth of the malignant lesion appears to be much slower than might be expected; therefore, the symptoms may have been present for some time, but at exploration the growth is not far advanced. On microscopic examination, most of the malignant gastric lesions removed from elderly patients are of low degree of malignancy, and in most cases there is no involvement of lymph nodes; hence the prognosis as regards longevity is particularly good.

The palliative treatment of inoperable, malignant gastric lesions.—In considering the treatment of carcinoma of the breast, and its recurrence, Handley stressed the point that physicians must not be content to treat only the operable or curable cases of malignant disease, but that to employ any procedure which can be carried out for the patient with a recurring malignant lesion, or an inoperable malignant lesion, which will make the remainder of the patient's life more comfortable, is a duty. No better example can be found of the value of palliative measures than in surgical treatment of inoperable carcinomas of the stomach.

Removal of a necrotic, ulcerating, bleeding lesion of the stomach, even though metastasis may be present in the liver, is a palliative procedure worthy of consideration in dealing with a patient whose general condition warrants it. Similarly, in the presence of obstruction, gastro-enterostomy not only will bring relief of the distressing vomiting, but will enable the patient to take adequate nourishment, and these effects of the operation mean restoration of weight and improvement in general well-being. Mayo and Balfour both have directed attention to the fact that patients may live two, three and four years, in fairly good health, following palliative removal of a malignant lesion of the stomach, even if metastatic nodules are found in the liver at the time of the operation. Hepatic metastatic growths seldom become sites of infection.

An ideal method of palliation, if complete removal of the lesion is impossible, is exclusion of the growth. This is done by dividing the stomach above the lesion, and anastomosing the upper, uninvolved portion of the stomach to the jejunum. In cases in which palliative resection or

gastro-enterostomy seems inadvisable, jejunostomy can be performed for feeding, and the patient's stomach can be kept empty subsequently by means of a stomach tube. Emphasis again should be placed on the fact that relief of symptoms and prolongation of life often can be afforded the patient with incurable carcinoma by treatment directed to these ends.

Summary

Carcinoma occurs more commonly in the stomach than in any other organ in the body and affects men three times more frequently than women. The symptom of common occurrence is persistent dyspeptic discomfort.

Carcinoma of the stomach can be detected by a competent roentgenologist in 95 per cent of cases, but the roentgenographic diagnosis of benign gastric ulcer does not exclude the possibility that the ulcer may be carcinomatous, nor does the diagnosis of benignancy on gross examination.

The prognosis in the surgical treatment of carcinoma of the stomach is dependent on the degree of malignancy of the lesion and on the presence of involvement of lymph nodes. In 1,000 consecutive cases in which carcinomas of the stomach were removed at The Mayo Clinic, three year cures were obtained in 52 per cent of the cases in which there was no involvement of lymph nodes, but in only 19 per cent of cases in which the lymph nodes were involved.

Exploration for every tumor of the stomach is indicated, provided the patient's general condition permits, and unless proof of unremovable metastatic growth exists.

Because many gastric ulcers are benign, many of them will heal under a proper medical regimen. The decision to treat such lesions medically, however, carries great responsibility. If the lesion is malignant, by the time it is found to respond unsatisfactorily to medical treatment, sufficient time may have elapsed for it to become inoperable. Medical treatment should be carried out with the patient in the hospital and under observation for several weeks, and frequent subsequent examinations of the stomach should be made. Even in cases in which excellent progress is made under medical care, the patients should be advised to return at frequent intervals for examination.

A gastric ulcer may be found to be malignant

on microscopic examination, even though it has all of the roentgenographic and grossly pathologic aspects of being benign.

The elderly patient with a malignant gastric ulcer should not be denied the benefits of operation. Successful, subtotal or total gastrectomy has been performed on patients who were between sixty-five and eighty years of age.

Palliative treatment of inoperable gastric tumors should be directed toward relief of pain and obstruction, and improvement in general condition. Removal of necrotic, ulcerating lesions is justifiable in selected cases even in the presence of hepatic metastasis. When removal is impossible, the exclusion operation of Balfour affords ideal palliation.

SACRO-ILIAC TUBERCULOSIS*

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TUBERCULOUS sacro-iliac disease has been encountered in 6 per cent of our series of orthopedic cases. The present discussion is a résumé of the treatment and results obtained.

Thirty-one patients with sacro-iliac disease have been treated at Glen Lake Sanatorium during the past ten years (Table I).

The right sacro-iliac joint was found involved in twelve instances, the left in sixteen, and both in three. Six patients presented posterior subcutaneous abscesses, one had a massive psoas abscess and in another a deep abscess had burrowed into the ischio-rectal fossa.

It is of interest to note that the lower portion of the joint was involved twenty-three times, the upper twice, and the entire joint six times.

Six patients in this group presented no other clinically demonstrable tuberculous lesion in either bone or viscera. However, in the remaining twenty-five, ten were afflicted with active pulmonary lesions, six had other bone lesions and nine had visceral and other bone lesions. The other bones and joints involved were the spine (10), hip (6), diaphysis of humerus (1), and sterno-clavicular articulation (1), while visceral lesions occurred in the lung (10), kidney (4), bowel (2), skin (1), lymph nodes (1), peritoneum (1), and larynx (1).

Diagnosis was made by history, physical signs, appearance of roentgenograms, examination of exudate and tissues from abscesses, and the ex-

istence of other proven tuberculous lesions elsewhere in the body.

All cases were treated by wholly conservative methods. Because of the existing visceral le-

TABLE I. RESUME OF THIRTY-ONE CASES OF SACRO-ILIAC TUBERCULOSIS

Age	-- 11 to 70	- Average 31
Sex	-- 14 females	- 17 males
Location	-- 12 Rt.	- 16 Lt. - 3 Rt. & Lt.
	-- 18 lower 1/3	-- 5 lower 2/3 -- 6 entire.
	1 upper 1/3	-- 1 upper 2/3
Abscess	-- 6 posterior	
	1 psoas	
	1 ischio-rectal fossa	
Other tuberculosis	-- 6 no demonstrable lesion elsewhere.	
25(-- 18 visceral -- kidney, pulmonary, bowel.	
(-- 13 other bone -- spine, hip, sternoclavicular.	
Treatment	-- Bed rest & heliotherapy	- 31
	-- Traction	- 13
	-- Casts	- 4
	-- Belt	- 3
Results	-- 5 dead -- pulmonary death 3	
	-- peritonitis & adenitis 1	
	-- amyloidosis & multiple abscesses 1	
	-- 2 lost track of	
	-- 7 improving in residence	
	-- 17 well	
Hospitalization	-- 17 cases clinically well - average 891 days.	

sions, absolute bed rest and heliotherapy was indicated over a prolonged period. In twenty cases immobilization was required to maintain the proper orthopedic position and to relieve pain and muscle spasm. All abscesses were evacuated by wide incision and subsequently treated with

*From the Department of Surgery, University of Minnesota, Minneapolis, and Glen Lake Sanatorium, Oak Terrace, Minnesota. Read by invitation at the annual meeting of the Clinical Orthopedic Society, Minneapolis, November 11, 1933.

iodoform packs until closed by granulation tissue. No other surgical procedures were employed.

Five patients died under treatment, three of

patients during their course of treatment, such as thoracoplasty, nephrectomy, radical operation for perirectal abscess, and the Henry fusion operation on the spine. From this, one can see that



Fig. 1



Fig. 2

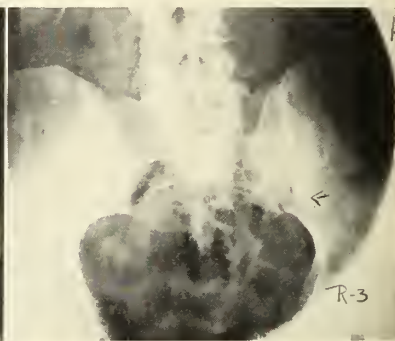


Fig. 3

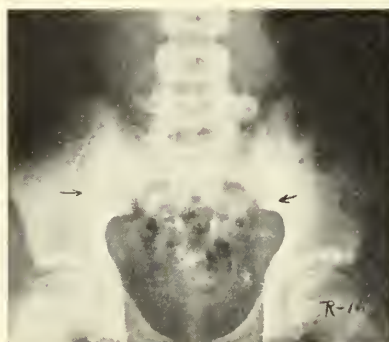


Fig. 4.



Fig. 5.

pulmonary lesions, one of peritonitis and adenitis, and one of amyloidosis and multiple abscesses. Two cases left the sanatorium after a few days, and have been lost, seven are improving under treatment, while seventeen have been discharged well. One of these seventeen died six years after discharge, of pulmonary and meningeal tuberculosis.

For the seventeen cases discharged well, the average number of hospital days was 891 (509-1654). Thus almost two and a half years was spent in the conservative treatment of these sacro-iliac lesions. To the orthopedic surgeon this seems entirely unnecessary when he is able to fuse such joints by surgical means and return his patient to industry in a few months. However, this short period of hospitalization has been directed toward only one tuberculous lesion, while our figure shows the time necessary for treating a tuberculous individual. Surgical procedures of major importance have been carried out on these

fusion operation on the sacro-iliac is entirely in order as far as surgical procedures in the tuberculous individual are concerned, but it has been our experience that the sacro-iliac lesions progress favorably while the other tuberculous lesions are being treated.

The final result is bone repair, and at least partial fusion of the diseased area in the sacro-iliac with complete return of normal body function.

It has been shown by us and other observers that fusion of a tuberculous joint does not mean absolute healing of the tuberculosis, although bony ankylosis does prevent recurrence. In this series there have been no recurrences over a period of three to six years.

The following two cases illustrate particularly the type of repair noted in these joints.

Case 1.—The patient, female, aged thirty-five, was admitted with pulmonary tuberculosis and tuberculosis of the right sacro-iliac joint. Figure 1 shows destruction

of the lower third of the joint on admission. The patient was treated by recumbency, traction and heliotherapy for one year. Figure 2 shows increased destruction under this treatment. Figure 3 shows sclerosis and new bone formation after four years of therapy for pulmonary and bone lesions.

Case 2.—A boy, aged fourteen, was admitted with tuberculosis of the right and left sacro-iliac joints, accompanied by an abscess draining over the right ilium. No other tuberculous focus was demonstrable. Figure 4 shows the destruction of both sacro-iliacs in their lower two-thirds. The patient was treated by recumbency, traction and heliotherapy. A guinea pig inoculated with material from the abscess developed tuberculosis. Figure 5 shows the return of contour and trabeculation in both joints after three years of treatment.

Conclusions

1. Tuberculosis attacks the lower portion of the sacro-iliac most frequently (75 per cent of our series).

2. The accompanying abscesses treated radically heal, and do not interfere with healing of the joint.

3. Of all tuberculous bone lesions 80 per cent are accompanied by visceral tuberculosis of one type or another.

4. Entirely conservative measures of therapy have given us 77 per cent clinical cures, with no recurrences, while 16 per cent of this group have died of progressive visceral tuberculosis.

5. Every surgeon should consider orthopedic tuberculous lesions from the standpoint of the specialist in tuberculosis, namely, that a tuberculous joint is practically always accompanied by tuberculosis in some other joint or viscus. These other foci may be healed, inactive, latent, or entirely undemonstrable, but until so proven the entire individual, and not just the joint in question, should be treated.

SELECTION AND PREPARATION OF PROSTATIC PATIENTS FOR OPERATION*

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THE chief problem of bladder neck obstruction is that of infection in the urinary tract. While it is debatable whether infection plays a role in the development of benign hypertrophy and of carcinoma of the prostate, there is no debate as to its part in the production of fatalities once bladder neck obstruction has developed, since autopsy studies show that bacterial inflammation of some type is responsible for most of them. The infection usually takes the form of an acute or chronic pyelonephritis but may also appear as pyogenic infections in or about the urethra, genitalia, or bladder, or as metastatic processes outside the urinary tract (peritonitis, pulmonary embolism, etc.). It is therefore clear that any plan of treatment of the obstructed urinary tract must take account of the great susceptibility of that tract to bacterial invasion.

Apart from the recognition of the various pathologic types of prostatic obstruction, and from improvements in the technic of their opera-

tive relief, the greatest single advance in the therapy of prostatism was undoubtedly the recognition of the necessity of preparing the patients for operation.

The Need for Preparation

This is based upon the well known fact that even partial retention of the urine increases the susceptibility of the whole urinary tract to infection, a fact which was observed clinically by Goodhart in 1874 and since verified experimentally by Melchior, Rovsing, and many others. Its mechanism is twofold.

First, the expulsion of urine through a partially obstructed urethra requires an increased intravesical pressure which, while probably intermittent in character, often rises above the venous pressure and so causes venous stasis, at first confined to the bladder and prostate, but later involving the ureters and kidneys. This stasis doubtless leads both to deficient oxygenation of the tissues and to an inadequate supply of white blood cells in the affected tissues, thus reducing local tissue resistance.

In the second place, the development of stag-

*From the Department of Surgery, the Medical School, Minneapolis, Elaboration of a paper on Sudden Decompression of the Bladder, presented at the meeting of the North Central Branch of the American Urological Association, Chicago, October 13, 1933.

nant residual urine in the bladder and the coincident slowing of the stream of urine in the renal pelvis and ureter further favor bacterial growth.

Another important predisposing factor is that of trauma, which has also been verified clinically and experimentally, and which is too often supplied by the catheter. Moreover, in a high percentage of cases, a chronic prostatitis is present and may supply the organisms for a fulminating infection in spite of the most scrupulous asepsis in catheterization, especially if trauma be inflicted. While the patient is usually more or less immune to his own organisms, the combination of retention and trauma may sufficiently reduce local resistance to make them deadly. An additional menace is the fact that the chill which may follow urethral manipulations in such circumstances is frequently associated with bacteriemia, an especially serious matter if venous stasis be present in the kidneys, since the consequent slowing of their circulation increases their exposure to the infecting agent. Thus certain patients with bladder neck obstruction are in a potentially precarious state so far as infection is concerned.

The Selection of Cases for Preparation

It goes without saying that it is desirable to have every patient in the best possible general condition, especially as concerns the circulatory system. In this, the coöperation of a capable internist is invaluable.

Granted that the patient's general condition is satisfactory, four questions concerning local conditions must be answered before operation may be undertaken:

1. What is the degree of urinary retention?
2. Is serious infection present?
3. Is the kidney function adequate to permit operation?
4. Are there local complications which may prevent or impair the result of operation?

1. *The Degree of Urinary Retention.* In the absence of a palpable bladder, this can be determined only by catheterization, which, in acute retention, is an emergency measure; in chronic retention it may be deferred until a convenient time. The importance of asepsis in catheterization is inestimable. A soft rubber catheter is best because it inflicts the least trauma. It should be thoroughly lubricated (by the injection of mucilage of tragacanth into the urethra in difficult cases), the urethral meatus prepared

with alcohol, and the catheter passed with a sterile forceps.

It is impossible to discuss the catheterization of prostatics without mentioning the old hypothesis that the sudden relief of a long-standing urinary retention is dangerous. This idea was mentioned in the Ebers papyrus, rediscovered by the French and English urologists of 1845 to 1860, and brought forth again in this country with considerable fanfare in 1912 by Pilcher, and in 1920 by Van Zwahlenburg. In brief, it depends upon the idea that sudden emptying of the chronically distended bladder causes a sudden fall in the intravesical tension, leading to venous stasis in the bladder and kidneys and later hemorrhages into them, with resultant oliguria, hypotension and death. However, it fails to take account of the following facts:

- (a) Spontaneous decompression probably occurs during the intervals between attempts to urinate; (b) the degree of retention which is supposed to require gradual emptying is not known; (c) nearly all patients dying after catheterization exhibit severe infections in the urinary tract; (d) infection can and does cause hematuria, hypotension, oliguria, renal insufficiency, and death; (e) comparison of similar series of cases shows that gradual emptying of the distended bladder does not lower the mortality which results from sudden emptying.

The writer has recently reviewed the evidence upon this point and has concluded that it makes no difference whether the bladder is emptied suddenly or rapidly, provided the catheterization be sterile and gentle, and *provided that one then prevents redistention* either by frequent catheterization or by use of the inlying catheter. Redistention of an infected bladder is particularly likely to be disastrous because urgent attempts to void may cause such a pressure rise in the bladder as to cause venous stasis, hemorrhage and even necrosis of the mucosa, conditions which afford an extremely favorable culture medium for bacteria.

If catheterization is impossible it is worth knowing that local or regional anesthesia may make it very easy. If the urethra has not been traumatized at all, *and then only*, the gentle injection of 20 cubic centimeters of freshly mixed one per cent cocaine with an urethral syringe and its retention for five minutes may be tried.

The presence of bleeding absolutely contraindicates the use of cocaine. If cocaine cannot be used, or if it fails, caudal anesthesia (30 to 45 cubic centimeters of two per cent novocaine) may be of great assistance. Since adopting these methods ten months ago the author has used cystostomy but once because of inability to catheterize a patient.

2. *Infection.* Having determined the amount of residual urine, the next step is determination of the presence or absence of infection within the urinary tract. If acute infection with fever is present, continuous catheter drainage with forced fluids (3000 to 5000 centimeters daily if well borne by the heart), bed rest, and urinary antiseptics are required. Failure to respond to these measures may require cystostomy to get rid of the irritative effect of the inlying catheter with its attendant absorption from the urethra.

Chronic infections are similarly treated with the addition of bladder lavage and of the ketogenic diet in suitable cases. Not infrequently it may be necessary to operate in the presence of a resistant chronic infection. If the patient is well-immunized as shown by the absence of a febrile reaction during the preparatory period, it may safely be disregarded, if, as will be pointed out later, certain precautions are taken.

3. *Kidney Function.* The next concern is for the renal function, which is most easily estimated by means of the fractional phenolsulphonephthalein test.* The objective of the drainage period should be to get the dye excretion as nearly normal as possible, which may require a few days or several months. Operation may be done when the excretion has reached a constant level.

4. *Local complications* are of two types: those which interfere with preparation, and those which may impair the result of the operative treatment. Acute prostatitis, urethritis, or periurethral abscess may subside under conservative treatment or may demand removal of the catheter, cystostomy, and corrective operation. If the drainage period seems likely to be long, vasectomy is desirable as a preventive of epididymitis.

Those complications which may impair the end-result consist chiefly of stone, bladder tumor or diverticulum, and of those lesions which lessen

the bladder's expulsive force (atony of the wall, *tabes dorsalis*). Stones are best excluded by x-ray; when present they can usually be removed by litholapaxy unless too large or too hard, when they may require suprapubic cystotomy, a procedure which decreases in frequency with an increasing experience in instrumentation.

Diverticula are readily recognized by x-rays made after distention of the bladder with warm, sterile, five per cent emulsion of silver iodide. If small they may be disregarded; those of moderate size may be left for later operation if required, since they may disappear or at least give no trouble with adequate relief of obstruction; large sacs require preliminary diverticulectomy to avoid persistence of retention, infection, and urinary symptoms.

In general, those diverticula which empty during catheterization of the bladder (but not of the diverticulum itself) may be left untreated.

A history of spontaneous hematuria demands a thorough, painstaking cystoscopic examination including retrograde or intravenous pyelograms to exclude vesical and renal neoplasms, especially since the latter often present the clinical picture of urinary retention due to clots. The preliminary cystogram is of value in demonstrating bladder tumors, but it must be remembered that while large neoplasms may produce characteristic filling defects, small ones may fail to do so.

Atony of the bladder wall is usually due to long-standing overdistention with atrophy or fibrosis of the detrusor muscle.

It is recognized by the fact that the urine, even in acute retention, drips from the catheter instead of issuing forcefully from it. It may also be recognized from the fact that the bladder is unduly large and has a characteristically flaccid appearance in the cystogram. This type of cystogram usually shows advanced trabeculation, cellule, and even diverticulum formation. The presence of atony is an indication for long-continued preliminary drainage since, if the bladder wall is flaccid, it will fail to empty after removal of the prostate. In late cases recovery will not occur because of fibrosis of the detrusor muscle, which cannot, therefore, recover its elasticity. These are happily rare. In doubtful cases it is desirable to relieve the obstruction, especially if this can be done endoscopically, resorting to prolonged suprapubic drainage if this fails.

*Six milligrams intravenously, four specimens at half hour intervals, using an inlying catheter and estimating the percentage elimination in each period. The minimum normal is 40 per cent with nearly half the total appearing in the first half hour.

Lesions which impair the expulsive force of the bladder via the nervous system and which appear at the prostatic age consist chiefly of tabes dorsalis, taboparesis, and arteriosclerosis of the spinal cord. While incontinence of urine, either true or paradoxical, is often a symptom of spinal cord lesions, it may be absent. Cord lesions are also to be suspected whenever the expulsive force is poor. Either of these symptoms is an indication for a careful neurological and cystoscopic examination, at which one may observe one or more of the cardinal signs of neurogenic dysfunction of the bladder, namely, relaxation of the internal sphincter, fine trabeculation (as opposed to the coarse trabeculation of the purely obstructive lesion), diminution in expulsive force, and loss of sensation. The presence of such disturbances in robust individuals with prostatic obstruction need not contraindicate its operative relief unless a true incontinence be present or unless there be complete loss of sensation. It is to be remembered that spinal cord lesions lead primarily to loss of expulsive force, so that a prostatic hypertrophy or fibrosis of insufficient degree to cause obstruction in an otherwise normal individual may cause complete retention in the tabetic. Thus, in properly selected cases, transurethral resection may be carried out with every expectation of success. The preparation does not differ materially from that in ordinary bladder neck obstruction.

The Indications for Cystostomy

With the increasing adoption of transurethral resection, the need for preliminary cystostomy in lieu of catheter drainage has been much diminished, chiefly because the period of drainage and thereby the quantitative exposure of the urethra to infection and irritation by the inlying catheter are reduced, thus diminishing the number of cases of periurethral abscesses, acute prostatitis epididymitis, and metastatic infections.

The chief indications for preliminary cystostomy are: inability to pass a catheter; serious local complications such as periurethral abscess; inability to tolerate the catheter when drainage is needed; a progressively severe infection in spite of catheter drainage; and the presence of complicating diseases requiring suprapubic operation. Chief among these are large bladder stones, bladder tumors not suited for cystoscopic treatment, and large diverticula which fail to empty.

In connection with cystostomy it should be pointed out that, if indicated, it must be done promptly and not after the patient is in desperate straits from the toxemia of a large periurethral abscess or other infectious process.

The Time for Operation

This is a question which is difficult to answer in general terms. The renal function should be the best obtainable in the particular patient. A phenolsulphonephthalein estimation should be done when the patient is first seen. If it is normal, no further preparation is needed so far as the kidney function is concerned. If it is materially reduced, drainage should be continued until the excretion reaches the highest possible level, particularly if open operation is contemplated. A moderate reduction in function is not a contraindication to transurethral resection if the condition of the patient is otherwise good, provided the operator is experienced so that the operation will be short. The inexperienced operator will do well to continue drainage until the kidney function reaches its acme, since the operation may be a serious undertaking, particularly with respect to loss of blood.

If the function remains stationary with drainage, no useful purpose will be served by prolonging it.

If infection is absent, the kidney function normal and less than three ounces of residual urine present, primary operation may be done. Mild chronic infection, good kidney function and a small residual urine require no preliminary therapy, while a more severe chronic type, particularly with functional impairment, requires drainage with forced fluids (three thousand cubic centimeters or more daily), urinary antiseptics, bladder lavage, using dilute silver nitrate, acriflavine, potassium permanganate, or the surgeon's favorite antiseptic (the mechanical cleansing is the important consideration) until the infection has subsided. The ketogenic diet may be of value. Pyuria which resists these measures must often be disregarded.

Acute renal infections as evidenced by fever and pain are absolute contraindications to operation. They require the same therapy as the chronic infections with functional impairment, with the addition that the patient should be kept in bed during the febrile period. Except for such times, care should be exercised to prevent the pa-

tient spending too much time on his back. The importance of moving about in bed, deep breathing, and pulmonary hyperventilation during periods of enforced bed rest cannot be overemphasized if lung complications are to be avoided.

What Are the Indications for Operative Treatment?

It is difficult to lay down any clean-cut criteria as to the necessity for operative treatment in bladder neck obstruction, since so much depends upon the situation of the patient. A poor man living on a farm far from medical help will, for his own safety, require an operation much sooner than his city brother who has physicians or charity clinics at his instant disposal. Too, one patient may elect to have an operation relatively early in the course of his disease to ward off future trouble, while another may try every conceivable means to avoid an operation until discomfort or danger makes it inevitable.

It is well known that a patient may recover from his first attack of urinary retention after the employment of simple conservative measures such as catheterization, hot sitz baths and rectal irrigations, and rest. Subsequent retentions are less likely to respond to such treatment, but may do so.

Moreover, patients with little or no residual urine but with definite obstructive symptoms may respond to similar measures, supplemented by prostatic massage, urethral instillations and dilations, and bladder lavage.

The symptoms may often thus be relieved for years even after an attack of complete retention. On the other hand, the presence of considerable residual urine and of functional impairment are definite indications for operation, while persistent complete retention is an absolute one. Certain patients suffer such severe symptoms and are so refractory to conservative treatment that operation may be demanded before any retention develops.

The Type of Operation

This is a sore point in these days of transurethral resection (or endovesical revision or the punch operation if you prefer). In most instances it is a question of the operator's personal preference, there being very few absolute indications for any one type of procedure.

In early prostatic carcinoma without extension or metastasis Young's radical perineal prosta-

tectomy is unquestionably the procedure of choice. In very large benign hypertrophies, suprapubic prostatectomy is to be preferred. I should define a "very large prostate" as one which makes transurethral resection technically very difficult or which will prolong it unduly. The actual criterion depends upon the operator's preference and ability. In this connection one must emphasize the fact that the size of the gland on rectal examination may diminish remarkably during drainage, so that one which feels as large as a tennis ball at the time of an acute retention may be smaller than normal after a week or two of drainage, due to the subsidence of edema. This same process may reveal, after a week or two, a typical hard, fixed carcinoma which was at first masked by edema.

Transurethral methods are required for small, firm glands, particularly those presenting a fibrous median bar, since these can rarely be enucleated, and suprapubic plastic procedures yield very poor results.

This bare outline leaves a large field for difference of opinion and discussion. It is the author's practice at present to resect all glands which are not so large as to present technical difficulties (one patient in the last one hundred eight operations on one hundred four patients). It is conceded at once, however, that this represents the writer's attempt to determine for himself and within his own limits how large a prostate he can resect advantageously. It may be that subsequent experience will lead him to modify his present attitude. In the meantime, the shortened hospitalization, the lower mortality (3.7 per cent in 166 operations on 158 patients, including thirty-eight carcinomas), not to mention the reduced expense for dressings, justify the policy. The question of recurrence in benign hypertrophy because of the necessarily incomplete removal of the abnormal tissue cannot be settled for some years to come.

I feel compelled to say, however, that the transurethral operation must be reserved for the experienced cystoscopist. For the man who occasionally "looks into the bladder" to attempt it is foolhardy, and is too often attributable to the activities of salesmen who picture the operation as one that any physician can do "if he buys our instruments." Even the experienced cystoscopist should begin, for technical reasons, with small glands.

Conclusions

It is almost trite to say that a low mortality in prostatic surgery depends upon a proper selection of patients and upon their thorough preparation. Once the patient is in proper condition, any capable surgeon can remove the prostate suprapubically or through the perineum. If the proper after-care, chiefly free drainage and an abun-

dance of fluids, be given, the mortality will reach an irreducible minimum and will represent the unavoidable frailties of old age.

Functional results, on the other hand, depend upon surgical skill, particularly in perineal and transurethral operations, which surely require more experience than the suprapubic operation if good functional results and low mortality are to be had.

THE RISE AND DECLINE OF HOMEOPATHY

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THIRTY years ago it would have been impossible to have written an impartial account of the history and contributions of homeopathy to the practice of medicine without calling down upon the head of the writer a storm of violent criticism from both the defenders and opponents of that school of practice. Those of us who have embarked upon a medical career in the last two or three decades fail to realize the strength of homeopathy at the beginning of this century.

The rivalry between the homeopathic physicians and what were variously termed the "allopaths," "regulars," or "members of the old school" was intense. The laity adopted one school or the other and stood by their choice with, at times, almost a religious fervor. All this, from the viewpoint of modern medicine, seems extremely narrow-minded, yet even today the ultra-conservative medico might very occasionally lay himself open to a similar charge. The "regular" to a certain extent scoffed at and perhaps feared the homeopath, and the latter naturally resented this and strove more valiantly to prove the truths of his medical faith. The writer, incidentally not a homeopath, draws somewhat from personal experience, because he is the son of one of the past presidents of the Minnesota State Institute of Homeopathy.

To better understand homeopathy at its height, we must look to the years following 1900. The University of Minnesota Medical School, until about 1910, had for the last half of its course two faculties, entirely separate, the one of them homeopathic. When this was abolished, for two

years more a chair of homeopathic philosophy and materia medica was maintained.

The Minnesota State Institute of Homeopathy, that is, the state medical society, was founded in 1867 (before the Ramsey County Medical Society) and held regular meetings until about seven years ago. Doctor Hutchinson, a homeopath of Saint Paul, was for several years after 1905 president of the State Board of Health. The superintendent of the Minneapolis City Hospital in 1905 was a homeopath, as were the staff and superintendent of the Fergus Falls State Sanitarium, and the superintendent of the Walker Sanitarium. The Ancker Hospital in Saint Paul had two complete and separate staffs until about 1915, one homeopathic and one "regular."

The State Medical Examining Board in 1895 consisted of nine men, three of whom according to law had to be homeopaths. In 1895, one patient out of every three admitted to the Minneapolis City Hospital was assigned to the homeopathic staff. In St. Paul the ratio was one to four. Other examples could be quoted, but this paper is not intended in any sense to be a eulogy of the past. The above examples are mentioned merely to show that in Minnesota, as elsewhere throughout the nation, homeopathy did grow to considerable strength and influence at one time.

Homeopathy, as a system of medicine, was given to the world by Samuel Hahnemann, who lived from 1755 to 1843. Before taking up the life of Hahnemann and the early history of homeopathy, it would be well to take note of the state of the science of medicine at that time,

approximately the year 1800. Primitive indeed was this early nineteenth century or, rather, late eighteenth century medicine. Bleeding, blistering, and purging were advised for nearly everything. Artificially induced abscesses or setons were in use. Complicated prescriptions of many ingredients of unknown action and in large doses were given on speculative hypotheses. A few measures were of proven value, but, for the most part, both diagnosis and treatment were utterly irrational.

The hospital situation was appalling. In the Hotel Dieu in Paris there were 1,200 beds, most of which contained four to six patients per bed. There were large halls containing up to 800 patients lying on pallets or heaps of straw in vile condition, and about 480 beds for single patients. Acute contagious cases were often in close relation to the mild cases, vermin and filth abounded, and ventilation was so abominable that the attendants and inspectors would not enter in the morning without a sponge dipped in vinegar held to their faces. Medical men themselves entered service in some of the hospitals with great fear and reluctance. Similar to this was the Allgemeiner Krankenhaus in Vienna. Hospitals remained notorious for uncleanness and general danger to life until well into the last century.

Bad as was the hospital situation, the facilities and methods for care of the insane were even worse. All but mild cases were either chained or put in small cages like animals. In Vienna these cages were put on exhibit and a small fee was charged for admission of the public, as to the sights of a menagerie. A bit more rational was the treatment in one locality for a melancholic or hysterical woman. She was treated to a volley of oaths and a deluge of cold water as she lay in bed.

The borderline between quacks and regular physicians was even more difficult to define than today. Dosage by legend, superstition, and empiric formula was the rule. Cure by touch, by John Hooper's Female Pills, Stoughton's great Cordial Elixir, Ching's Worm Lozenges, quassia cups, anodyne necklaces for pregnant women, Perkins' tractors, vied in favor with the beginnings of rational scientific medicine as taught by such men as Laennec, Jenner, John Hunter, Priestly, and others.

Into such a hodgepodge of science and superstition came Samuel Hahnemann, a distinguished

German scholar, scientist, and physician, who was born in 1755 and died in 1843. Educated largely at Leipsic and Vienna, he defended his thesis on "A Consideration of the Etiology and Therapeutics of Spasmodic Affections" at the University of Erlangen, and was given his degree of Doctor of Medicine by this institution.

While in Vienna, he came under the notice of Dr. Von Quarin, physician to the Emperor Joseph and Maria Theresa, who was so impressed with the ability of his student that he made him his especial protégé, taking him even to visit his private patients, a thing he had never done before.

Von Quarin also secured for him the position of family physician and librarian to Baron von Bruckenthal, Governor of Liebenburgen, where he passed much of his time cataloging the Baron's immense library. By the time he gave up this position, he was a master of Greek, Latin, Hebrew, English, French, Spanish, Italian, Syriac, and Arabic as well as his native German, but his literary prowess was not at the expense of his scientific education and he was an accomplished chemist.

His "wine test" by which lead in a dilution of 1-30,000 could be detected in the presence of iron is used today and of it Trommsdorff's Journal of Pharmacy stated that ignorance of Hahnemann's wine test was damning evidence of the incompetence of many apothecaries.

In 1786 his masterly work on "Poisoning by Arsenic: Its Treatment and Judicial Investigations" marked a new era in the analysis and best modes of detection of arsenical poisoning. In it he opposed the unregulated sale of arsenic "fever powders" and proposed that there be a locked room for poisons in the drugstore; that only the proprietor or some responsible person should have the key; that record should be kept in a book of the name and address of the purchaser, who should sign this record, which should be open to the inspection of a Board of Examiners. In his research, he quoted 861 passages from 389 different authors and books in different languages and belonging to different ages, giving accurately both column and page.

For seven years (1787-1794) he was a contributor to Crell's Annals of Chemistry.

Demachy was one of the first chemists of the day and the French Academy had published his work on the "Art and Manufacturing of Chemi-

cal Products" in order that the people of France might learn the various processes of the manufacturer hitherto kept for the most part as trade secrets, especially by the Dutch.

Hahnemann translated this work into German, adding copious original notes to the text, quoting exhaustively from many authors. Where Demachy remarked that he knew of no work on the carbonification of turf, Hahnemann mentioned six; he quoted a French analyst without giving his name and Hahnemann furnished both the author's name and the title of his book; he mentioned a celebrated German physician and Hahnemann gave the name, book and passages, etc., etc. He corrected the mistakes of the author regarding the use of alum in Russia, Sweden, Germany, Italy, Sicily, and Smyrna; he gave new directions for making of retorts and introduced many original chemical improvements and tests, and altogether made the work the most complete treatise of its time on the subject.

His ideas in medicine were equally advanced. He reported his treatment of caries of bone by clean curettage and alcohol dressings. Early in 1792 he advocated, in a journal, a humane treatment for the insane, who were at that time treated more as criminals, with the result that he was in June of that year placed in charge of one Klockenburg, Minister of the Police of Hanover, who recovered under his care. It was at the end of that year that Pinel made his first experiment of unchaining the maniacs at Bicêtre, Paris.

This brief review has been given in evidence of the fact that Hahnemann was neither an ignoramus nor a charlatan.

To one of scientific habits of thought, the application of the medical knowledge of 1800 in the care of the sick was most depressing, and fearing lest he should actually do more harm than good Hahnemann gave up his practice and devoted himself to the more gratifying subjects of chemistry and the languages.

Thus it happened that, in 1790, he translated William Cullen's "Treatise on the Materia Medica." Not satisfied with the author's explanation of the efficacy of cinchona bark in intermittent fever, he took some of it himself in experiment. Presumably he had an idiosyncrasy for the drug; at any rate he developed the majority of the symptoms of its physiological action and much to his surprise this reaction was similar to the

condition for which it was being successfully used.

Had he stumbled upon a scientific basis for prescribing such as he had longed for? The paradox of similars did not disturb him probably as much as it would physicians of today because the treatment of "likes by likes" had been advocated in an unscientific way since the days of Paracelsus. He tried it again on himself, then on his family and such friends as would submit to his experiment and with the same result.

Then came a search through the annals of medicine for reports of medical cures and the effects of drugs on the healthy, as in cases of poisoning, and he eventually reported nearly 500 citations covering sixty-three drugs in which there was a relationship of similarity between the action of the drug on the healthy body and the manifestations of the disease.

In 1796 he presented his observations in an "Essay on a New Principle for Ascertaining the Curative Powers of Drugs" which was published in professional manner in Hufeland's Medical Journal at Jena, and, in 1806, in a pamphlet entitled "Medicine of Experience."

Meanwhile he had been studying drug effects on the healthy by experiments on himself and fellow workers. Eventually these were published in his work "Materia Medica Pura" in which are given what he called the "proving" of fifty-four remedies.

In 1810 he published his "Organon of Medicine," which title seems to have been inspired by Bacon's "Novo Organum" and in which he applies Bacon's inductive reasoning to medicine.

It is worth while to quote verbatim the first four articles:

1. "The physician's high and only mission is to restore the sick to health, to cure, as it is termed."

2. "The highest ideal of cure is rapid, gentle, and permanent restoration of the health, or removal and annihilation of the disease in its whole extent, in the shortest, most reliable, and most harmless way, on easily comprehensible principles."

3. "If the physician clearly perceives what is to be cured in diseases, that is to say, in every individual case of disease (*knowledge of disease, indication*); if he clearly perceives what is curative in medicines, that is to say, in each individual medicine (*knowledge of medicinal powers*); and if he knows how to adapt, according to clearly defined principles, what is curative in medicines to what he has discovered to be un-

doubtedly morbid in the patient, so that the recovery must ensue—to adapt it, as well in respect to the suitability of the medicine most appropriate according to its mode of action to the case before him (*choice of the remedy, the medicine indicated*), as also in respect to the exact mode of preparation and quantity of it required (proper *dose*), and the proper period for repeating the dose;—if, finally, he knows the obstacles to recovery in each case and is aware how to remove them, so that the restoration may be permanent: *then he understands how to treat judiciously and rationally, and he is a true practitioner of the healing art.*"

4. "He is likewise a preserver of health if he knows the things that derange health and cause disease, and how to remove them from persons in health."

Regarding the exciting cause he writes farther on:

"It is not necessary to say that every intelligent physician would first remove this where it exists; the indisposition thereupon generally ceases spontaneously. He will remove from the room strong-smelling flowers, which have a tendency to cause syncope and hysterical sufferings; extract from the cornea the foreign body that excites inflammation of the eye; loosen the over-tight bandage on a wounded limb that threatens to cause mortification, and apply a more suitable one; lay bare and put a ligature on the wounded artery that produces fainting; endeavor to promote the expulsion by vomiting of belladonna berries, etc., that may have been swallowed; extract foreign substances that may have got into the orifices of the body (the nose, gullet, ears, urethra, rectum, vagina); crush the vesical calculus; open the imperforate anus of the new-born infant, etc."

The rest of the work is occupied with amplifying these principles.

In his consideration of what is to be cured in disease, he directs that each case must be individualized and that treatment should be directed against what he calls the "totality of the symptoms," by which he means everything that can be learned about the patient. To this end he gives detailed instructions for a written case record (an innovation to medicine) beginning with the patient's voluntary statements; amplified by the examiner's questions, which should never be leading; and concluded by what the physician can observe. This section of the work could be embodied verbatim in a modern textbook on diagnosis and not be out of place. We know that Hahnemann used the recently invented stethoscope and there is no reason to believe that he would not have used all the other instruments of diagnosis had they been at his command. His

references to surgery indicate that he considered this a separate department of practice not in conflict with his system of medical treatment except in borderline cases.

In his consideration of what is curative in medicines, he proposes the innovation of ascertaining their action by their administration to healthy human beings, the emphasis being upon the word "healthy" rather than "human," for experimentation upon the lower animals does not seem to have occurred to him. He gives credit for the idea to Von Haller, who was the only person so far as he could discover who had previously advocated it and no one had followed up his suggestion.

The application of the drug to the disease, he said, should be on the basis of similarity of action to manifestation, in accordance with what he called a therapeutic maxim, "*Similia, similibus curentur*": let likes be treated by likes. This maxim has sometimes been erroneously quoted as "*Similia similibus curantur*," likes are cured by likes, but the first spelling is correct and more properly describes Hahnemann's original idea as a *principle of treatment* rather than a *guarantee of cure*. Naturally giving a drug for symptoms similar to those which it will produce requires the dose to be subphysiological.

This theory that "like cures like" has always been a target for ridicule by other members of the medical profession. Of course, Hahnemann's reasoning on this point was purely inductive and general laws were promulgated from a smaller group of specific cases. However, many conclusions arrived at by purely inductive reasoning stand today as established facts in medicine. Let us try to state the ancient homeopathic principle of "let likes be treated by likes" in more modern language and see whether it may not at least cease to appear medieval and without foundation.

If a patient is suffering from a certain disease, for example, a low grade pulmonary tuberculosis, hay fever, poison ivy dermatitis, common cold or furunculosis, the patient's resistance, opsonic index, immunity, or what have you, can be increased by giving to that patient something which tends to aggravate the symptoms, produce similar symptoms, stimulate the forces in the body combating that disease; in short to immunize the patient. Let that medication be tuberculin, poison ivy vaccine, chlorine or a vaccine for colds, a

vaccine for furunculosis, foreign protein therapy if you will, or let it be a drug proved by long and careful experiment on healthy human beings to produce similar effects. The outcome of the disease, it would often seem, is not much affected by either the treatment of 1934 or the treatment of 1800, but the theory of treatment in these widely separated eras is possibly not so widely separated as we would sometimes fondly believe. We self-termed modernists (medievalists we will be called in the year 2034) delight to scoff at primitive medicine and congratulate ourselves on our pure scientific attitude as doctors. And yet perchance there was a bit of wisdom in the ancients, and even possibly a bit of folly in modern medicine.

But to leave philosophy and return to our history: Hahnemann, in addition to all the above, advocates most strongly the single remedy rather than "shotgun" prescriptions for disease. And finally he urges the value of hygiene and general supportive measures as adjuvant to the administration of drugs.

These then are the principles of homeopathy, many of them original contributions to modern medicine.

1. The individualism of cases.
2. The minute attention to subjective and objective manifestations of disease with written record.
3. The determination of drug action by experiments on living and healthy tissue.
4. The prescribing of drugs for curative purposes on the basis of similarity.
5. The condemnation of polypharmacy.
6. The minimum dose.
7. The removal of the cause when it can be found and removed.
8. The value of hygiene.
9. The resort to surgery in non-medical cases.
10. The prevention of disease.

This was the conception of homeopathy held by the founders of the American Institute of Homeopathy in 1844 when they limited their membership to physicians who were Doctors of Medicine (although this degree was not universally held nor considered necessary to practice), and when there was not a homeopathic college in the world.

This was also the conception of homeopathy held by the later members of that same body when they defined a homeopathic physician as

"one who *adds* to his knowledge of medicine a special knowledge of homeopathic therapeutics and who observes the law of similia. All that pertains to the great field of medical learning is his by tradition, by inheritance, by right.

Hahnemann was not a saint and he was not infallible. When his theories, presented in professional manner, were not generally accepted, but rather subjected to the criticism given all new pronouncements, even when true, he developed an invective that was not conducive to a fair consideration of his thesis, and later in his life he developed a dogmatism which was most unfortunate.

Not satisfied with the statement of his observations regarding drug actions, he proceeded to explain them with theories as speculative as any which he had condemned in his opponents.

Of course, Hahnemann made mistakes which, in the light of our present day knowledge, seem uncalled for, but so did most of the great pioneers in medicine. Certainly his contributions can be weighed against his errors with credit to him.

Unfortunately many great movements seem destined to suffer at the hands of their unintelligently overenthusiastic followers. Just as the fundamentalists of the French Canadian Colonies were said to be more French than the king and more Catholic than the pope, so many of the earlier homeopaths were more Hahnemannian than Hahnemann.

They carried their minute examinations of symptoms to a detail that had nothing to do with disease. A blond patient living in a brown stone house on the south side of the street may have been thought to require a different medicine from a brunette living in a green frame house on the north side. They carried the dilution of drugs (which was, of course, done on the principle that a small dose of a drug cures symptoms produced by a large dose) to an extreme that was idiotic. Homeopathic dilutions are made from the tincture of the drug, a one X dilution being one to ten, a two X, one to one hundred, et cetera. Dilutions of twelve X, one to a trillion, were not infrequently used. One extremist advocated the making of dilutions by placing a drop of the tincture in a beaker and running water from a faucet into it, the length of time for this procedure depending upon the dilution desired. It has been estimated that in order to make the dilutions in full quantity of one drop of the

original tincture to some of the highest dilutions used would require more water than the total in all the oceans of our planet.

In their zeal for the individualization of cases, they denied the value of a diagnosis and treated symptoms only, according to homeopathic principles, and, worst of all, Hahnemann's followers so far forgot his teachings that they overlooked the fact that homeopathy was not presented as a "cure-all" and that it did not exclude the use of other therapy of value such as surgery, hygiene, new drugs with direct action as morphine, and digitalis, vaccines, antitoxin, et cetera.

The modern rational homeopath was quick to make use of all advances in scientific medicine as they were presented. He was willing to discard his empiric drugs in place of newer therapy of greater value, and was able to realize that a system of therapeutics a century old would eventually be largely replaced by new discoveries. A prominent physician speaking before the state homeopathic convention in about 1910 showed that attitude of the progressive element when he said, "Homeopathy has made a great contribution to the progress of medicine. It has been a pleasure and an honor to practice during its greatest years. Its mission has been fulfilled and from now on we can expect to see its strength gradually diminish with the advance of modern medical science."

Hahnemann and homeopathy held a very important place in the practice of medicine during the past century. By this group was initiated the scientific study of the physiological action of drugs, by them over-dosage in "shotgun" prescriptions was first discouraged, and in stressing the importance of hygiene and general care in combination with these principles they helped to build the foundations for what we fondly term modern medicine. That many of the old homeopathic drugs are now either replaced or have been proved without benefit may be true, but it is also equally true that some of these drugs, condemned by intolerance rather than by test, may be of great value and are perhaps entitled to a more careful proving before being relegated to a position of mere historical interest.

Today there are two homeopathic medical schools of importance, one in New York, and one in Philadelphia. The proportion of physicians trained in homeopathic schools is rapidly decreasing, and the bitter partisan feeling of thirty years ago is met with only occasionally. Homeopathy as a distinct entity is vanishing—but the fact that the homeopathic school has persisted for over a century in spite of its irrational enthusiasts and equally irrational critics, and has produced some of the great physicians of the country, is a just tribute to its real contribution to the practice of modern medicine.

CASE REPORTS

THE USE OF MAGGOTS IN OSTEO-MYELITIS AND NECROSIS*

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The use of maggots in osteomyelitis of the humerus is the first case which I am reporting. It is, I believe, the first case so treated in a Saint Paul hospital. This case can be best presented by a brief review of the history and my operative procedure before introducing the maggots.

At 9:30 p. m., October 23, 1931, I was called to see a man whom I found in bed suffering from terrible

paroxysms of pain in his left arm. On September 11, 1931, while working with a paving crew handling a tamping machine, he was hit on the left arm between the shoulder and elbow by some part of this machine. The arm pained him for a few days but not enough to prevent his working. After the pain wore off he experienced numbness in this area. He applied liniment to the arm and continued to work.

On October 18, 1931, he had a sudden severe pain in the arm between the shoulder and elbow which made him sick and weak. Upon looking at his arm he saw a small red area about the size of a half dollar on the outer side of the arm about half way between the shoulder and elbow. He called on a physician, who advised him to go to bed and apply hot applications. This he continued doing with the condition growing worse until I was called on the evening of October 23rd.

Upon examination I found an unusually muscular man, about thirty years old. He was perspiring freely and undergoing paroxysms of pain about every two minutes. The left humerus was found to be exquisitely tender, most marked at the junction of the lower

*Read before the Wabasha County Medical Society, July 6, 1933, Wabasha, Minnesota.

and upper third. The skin was quite red, which may have resulted from the hot applications that had been applied. His temperature was 104 degrees F., respiration 52, and pulse 130.

I advised immediate removal to the hospital for operation and took him to St. John's Hospital, Saint Paul, where he was admitted at 12:20 A. M. Anterior-posterior and lateral x-ray films were made of the left elbow, including the upper third of the radius and ulna, and the lower two-thirds of the humerus. No evidence of bone or joint disease could be found. His white cell count was 16,000; urine negative.

Under ethylene anesthetic, an incision was made about four inches long over the external lateral lower third of the left humerus, the muscles being separated carefully down to the periosteum, to prevent injury to any nerves. The periosteum appeared darker in color than normal and, incising it, a small amount of pus exuded. I then drilled into the cortex of the humerus at the junction of the middle and lower third. As soon as the drill reached the medullary cavity grayish pink pus welled out from the drill hole, indicating that it was under considerable pressure in the medullary cavity. Three more holes were drilled parallel to the shaft of the humerus distal to the first hole, the lower two close enough together to unite them. Into the lower two a rubber drain was inserted well into the medullary cavity. Iodoform gauze was packed loosely into the opened muscle area. A few skin clips were used to hold the drain in place. Smears and cultures were taken of the pus before drains were inserted and the laboratory reported many staphylococcus colonies. After the operation the patient was returned to his room with Dakin's dressing over the wound.

The following afternoon his temperature was again 104 F., pulse 120, respiration 30. His temperature ran from 101 F. to 104 F. until on the fifth post-operative day it went to 106 F., pulse 160 and respiration 28, after which his temperature dropped from 103 F. to 101 F.

On November 19, 1931, owing to the fact that the patient was very toxic and the muscles were growing over the drill holes in the bone and interfering with drainage, we again enlarged the skin incision, separated the muscles and made larger holes in the medullary cavity. Following this procedure the drainage improved and his condition improved but x-rays on December 12, 1931, were reported as follows: "There is evidence of further attempt at involucrum formation but that repair is overbalanced by destruction of middle and lower thirds, particularly of the lower end of the humerus where the external condyle is undergoing sequestration. There is marked narrowing of articular space between the external condyle and the head of the radius, indicating destruction of joint cartilage."

Two days after this report his temperature again shot up to 103.2 F., pulse 125 to 130, and he again became very toxic and marked swelling developed about the elbow joint. On December 18, 1931, he was again anesthetized in his room under nitrous oxide and the incision was lengthened to 10 inches. The muscles were separated with blunt dissection down to the bone, the periosteum stripped off and the medullary canal opened up and down for about ten inches along the lower and middle thirds of the shaft of the humerus. A penrose drain was inserted into the elbow joint region and the opening in the medullary canal was filled with vaseline gauze strips. Following this procedure his temperature came down some but his general condition was poor, and the soft parts of his arm from shoulder to elbow seemed to be in such a highly infectious and necrotic condition that amputation seemed highly probable as the next necessary procedure. The report of the laboratory of specimens removed at the operation was as follows: "The specimen of bone consisted of three fragments, one which measured 4 x 2.5 x 1 cm. which appeared to be the cortex of a long bone. It was thickened and showed sequestrum formation on

its inner surface. It appeared to be definitely necrotic on the under surface of the specimen. The other two fragments measured 3.5 x 2 x 5 cm., respectively, and had the gross appearance of sequestra."

He was typed for blood transfusion but this was delayed because of his severe reaction on intravenous glucose injection.

Beginning December 20, 1931, normal saline only was used for moist dressings on the arm and on December 22, 1931, he was given 1500 units of tetanus antitoxin and on December 23, 1931, hypodermoclysis of 5 per cent glucose was again given. Maggots* were introduced into the wound the morning of December 24, 1931.

There were twelve consecutive applications of maggots to the wound. Each set of maggots was left on five days and removed. Twenty-four hours were always allowed to elapse before new maggots were applied and in a few instances the patient was allowed to rest for as much as three days before they were re-applied. About the third day after the application of maggots, a piece of sequestrum 9 cm. by 2 cm., half cylindrical in shape with its surface markedly roughened, was removed with little difficulty. He was under maggot treatment for seventy days. While the wound was full of necrotic tissue, the maggots grew rapidly in size. The last two batches of maggots did not live, as the wound was clean and devoid of necrotic tissue. At first the wound discharged much thin pus following the application of the maggots until it was necessary to cut a trap in the copper gauze over the wound and withdraw the pus with a glass syringe several times a day; but as the necrotic material disappeared this subsided and at the time of the last two applications of maggots the wound was filled with straw-colored, clear serum, on the surface of which floated a few fat droplets. The exposed muscle was clean and the skin edges and superficial fascia had a good granulation surface.

During the application of maggots to the wound, it was remarkable how the toxic condition of the patient decreased and his appetite improved. His hemoglobin, which was 50 per cent at the time of the first application, came up to 65 per cent at the end of the treatment. His white cell count dropped from 16,200 at the beginning of the treatment to 9,800. Two days before and during the intervals between maggot treatments, the wound was dressed with normal saline dressings. Because of the psychic reaction he might have had to the procedure, great care was taken, and with complete success, to keep the patient unaware of this maggot treatment. He left the hospital September 22, 1932.

The patient now has an arm ankylosed in a good useful right-angle position and has the use of his hand. He has occasionally a small drainage of pus from the elbow but this is decreasing, and he is working every day operating a truck. His weight in the hospital on the first day that he was able to go to the scales was 153 pounds; now he weighs 195 pounds.

My opinion is that the benefit the patient derived from the maggot treatment was not due to any enzymes stimulating his organism, but to the devouring of the necrotic mass of tissue by the maggots and thus ending its absorption by the patient.

The second case that I am reporting illustrates a new and different use for maggots. In this instance they were used for the purpose of removing a large mass of necrotic tissue on the lateral aspect of the middle of the left arm, undoubtedly due to necrosis following repeated hypodermic injections in this region.

The clinical history follows:

*These were obtained from the Lederle Laboratories.

A man, aged sixty-four, was brought to St. John's Hospital on November 21, 1932, suffering from a boggy, edematous, indurated swelling of the perineum and area surrounding the anus. This mass was very tender and painful on palpation, and a rectal examination disclosed on the left side and involving the prostatic gland an induration which was very tender. There was no fluctuation but a prostatic abscess appeared to be forming, not yet ready to incise. His temperature was 102 F., pulse 100, and respirations 21. His physical examination was otherwise negative.

The laboratory examinations revealed the patient to be a diabetic. The urine contained 4 per cent sugar; the blood sugar was 235 mg. per 100 c.c. of blood. The x-ray films showed the outlines of both kidneys indistinctly. There was no evidence of renal, urethral, vesical or prostatic calculi.

The patient was placed on insulin and a diabetic diet but he grew worse and had several chills. Rectal examination still did not show any area of fluctuation developing in the region of the prostate. Hot packs were continuously applied. On December 1, 1932, he became unable to void. A proctoscopic examination revealed swollen external hemorrhoids and an inflamed mass in the rectum over the prostatic area. There was no evidence of fistula or ulcers in the rectum or lower colon. He was then catheterized every eight hours unless able to void voluntarily, and on December 1 an indwelling catheter was inserted.

His general condition continued growing worse. He developed involuntary bowel movements and was at times delirious. His temperature rose to 105 F., white blood count 17,000, and he was very toxic. Repeated intravenous injections of normal saline were given, and on December 3 he was given a blood transfusion of 640 c.c. of whole blood by the Scannell method.

Following this his general condition improved and an area of fluctuation developed in the prostate. On December 5, 1932, an abscess of the prostate was opened through the perineum and a retention urethral catheter was inserted into the bladder. His condition then improved and his temperature fell to normal on the fifth post-operative day.

On the night of the ninth post-operative day he complained of pain in his left arm and on the following day he developed a cough and commenced to raise considerable phlegm. His pulse and temperature increased and it was evident that he had developed influenza. His heart required considerable stimulation, which was administered frequently by hypodermic medication together with regular injections of insulin. A red swollen area appeared on his left upper arm on December 16, which had increased to the size of a baseball by the evening of December 17 and was hard and indurated. His influenza infection did not improve and he became so toxic from the necrotic mass forming in his left arm together with his respiratory infection that I deemed it necessary to give him a second blood transfusion on December 20. His general condition showed improvement after this and his resistance to the influenza increased so that seven days after the blood transfusion his temperature was again normal.

However, the red indurated mass on his left arm did not develop into an abscess under hot pack treatment, but turned into a large white mass of necrotic tissue, 11 cm. long and 5 cm. wide, oval in shape. No pus exuded from any openings on its surface and there was no definite line of demarcation nor bright red line of separation about the edge of this necrotic mass. There was no evidence of healing. Therefore, I applied maggots to the area January 2, 1933, at the same time giving 1500 units of tetanus serum. These maggots were removed January 4 because they had all died, probably due to the fact that the necrotic tissue had absorbed both Dakin's and boric acid solutions used in the hot

packs applied to the area. From the center of this mass a piece about 1 cm. deep and about 5 cm. by 3 cm. was removed and warm saline solution packs only were used on this area until the morning of January 7, 1933, when I again applied maggots. By January 8th the arm commenced to drain a moderate amount of serous fluid through the lower portion of the maggot trap. The drainage increased moderately from day to day until the maggots were removed on January 11th, by irrigating with saline solution into a pus basin containing a strong solution of lysol. This was advisable to do because the maggots were large and very active.

The appearance of the wound after the maggot treatment was very striking. The floor of the wound consisted of muscle entirely denuded of fat and fascial sheath and showing the muscle fibres themselves. The edges of the wound were clean cut and had a punched-out appearance with only healthy skin remaining, but the edges were thinned out and undermined so that a probe could be passed under for 7 cm. below the edge of the skin on the inferior border of the wound toward the elbow, and for about 4 cm. superiorly toward the shoulder. The undermining along the lateral borders of the wound was only from 1 to 3 cm. in depth. But all of the wound was thoroughly free from necrotic substance, only live, healthy tissue remaining with no hemorrhage or oozing of blood. One application of maggots had completely removed all of this mass of necrosis in five days.

Dakin packs were then used on the area and in seven days the undermined edges had adhered to the granulation tissue forming in the base of the wound. On the floor of the cavity appeared pinkish red translucent granulations, and the edges became sloping and bordered by a thin, bluish white layer of young growing epithelium. But the healing of skin from the edges was so slow that on January 30th I performed a Thiersch skin graft, taking the skin from a male relative. Most of this graft took and in fifteen days after the graft the growth of skin had completely covered the area.

This patient spent a long convalescence period in the hospital after this, due to the slow healing of his perineal wound subsequent to opening the prostatic abscess. Because of his weakened condition complicated with diabetes, there was much sloughing about the perineal wound, and a retention catheter had to be kept in place to allow a urinary fistula to close. Maggots in the perineal wound were, of course, inadvisable due to the impossibility of placing a maggot trap in this location.

In conclusion, it would seem that we have in maggot treatment of necrotic tissue a means of removing dead tissue much more completely and efficiently than with the knife. No normal living tissue is sacrificed because the maggots do not devour living tissue. This was shown in the first case reported, when the maggots upon the last two applications died because of insufficient tissue to feed upon.

It is my opinion that this treatment may be added to the armamentarium of surgery wherever a necrotic area exists which does not rapidly develop a line of demarcation between living and dead tissue and complete separation does not readily occur; also, where undermining of living tissue by necrosis develops, as sometimes happens in diabetes, nephritis or senility, and wounds or ulcers assume an unhealthy looking, soft, edematous granulation, popularly known as "proud flesh."

TRAUMATIC PSEUDO-CYST OF THE PANCREAS

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H. M., a barn man, aged twenty-one, was first admitted to St. Luke's Hospital on March 29, 1932, having been kicked in the mid-abdomen by a horse, several hours previously. He was complaining of severe upper abdominal pain and had been vomiting. There was no blood in the vomitus.

Examination revealed a well developed white male in acute pain. Imprint of a horse's hoof was visible on the skin of the upper abdominal wall and he complained of extreme tenderness in the epigastrium and in the right upper quadrant of the abdomen. The abdominal wall was very rigid. Temperature was 98.2, pulse 80, B. P. 110/60 and white blood cell count 15,400. He was put to bed and morphine sulphate gr. $\frac{1}{4}$ was ordered to be given as often as necessary to control the pain. Nothing was given by mouth except cracked ice.

The pain was controlled, vomiting ceased, and pulse and blood pressure remained normal. The temperature rose to 99.6 on several occasions, but did not remain elevated for a prolonged period. Neither the stools nor vomitus at any time showed blood. The urine, which on admission contained scattered red and white cells, became normal. Slight rigidity and tenderness persisted over the gallbladder region but since the patient felt otherwise well he was discharged from the hospital after a nine day stay.

At home, the pain and tenderness in the right quadrant persisted for three months (April, May and June). It then gradually subsided. In July, however, when the patient tried to work again, he experienced pain, particularly on moving about.

On October 2, 1932, he was again admitted to St. Luke's Hospital. For the past two weeks he had been belching a great deal and for the past three days he had vomited frequently. He had lost fifteen pounds in weight. Examination at this time was negative except for right sided abdominal tenderness, and a leukocytosis of 17,200.

The first operation was performed on October 4, 1932 (Dr. Bakkila). A pseudo-cyst of the pancreas was found and drained. Areas of fat necrosis were present, and the tail of the pancreas was firm and enlarged. Convalescence from this operation was stormy and fluid in the cyst rapidly reaccumulated, causing gastric obstructive symptoms due to pressure.

Five subsequent operations were performed at varying intervals combining the procedures of marsupialization, suturing the cyst cavity to the abdominal wall, uniting the greater and lesser omental bursæ and attempting to obliterate the cyst cavity with chemicals, and finally extirpation of the cyst wall. The accumulation of fluid was apparently encysted in the lesser omental bursa, and when it attained considerable size, caused pressure on the stomach and duodenum, with pain and vomiting. Each time there was difficulty in maintaining drainage. The last operation was performed October 6, 1933, just one year after the original injury. This time it was possible to enucleate the wall of the cyst-cavity, which lay back of the stomach and burrowed under the pancreas. The tail of the pancreas was found to be connected to the body by only a narrow band of pancreatic tissue containing blood vessels. The tail of the pancreas distal to the point of injury was removed along with the cyst. The gallbladder, which had been drained at one of the previous operations, was removed. Hydrops of the gallbladder had resulted from occlusion of the cystic duct at the time of injury.

Recovery from this last operation was uneventful and the patient was dismissed from the hospital on the eleventh postoperative day.

He has been seen from time to time and at the present time, seven months later, he is well and back at work.

Report from the pathologist: The cyst wall is very thin and transparent in some areas; in others, 0.2 cm. thick. It is made up of cellular connective tissue with a few scattered atrophic glandular acini and an occasional duct. The internal surface is partially lined by a layer of flattened cells.

The portion of pancreas removed consists of markedly fibrotic tissue with scattered islands of pancreatic tissue and occasional masses of cells resembling Islands of Langerhans. Marked lymphocytic infiltration is present.

Discussion

This case brings up several very interesting points. The amount of fluid secreted by these injured tissues was remarkable. Even though frequent attempts were made to obliterate the cavity with iodine, iodoform gauze, etc., fluid reaccumulated in large amounts. It was difficult to maintain external drainage. As soon as drainage stopped, the patient suffered with symptoms due to obstruction of the pylorus from pressure.

The probable course of events was as follows: The impacting horse-hoof crushed the pancreas against the spine, cutting through approximately two-thirds of its width at that point. The central pancreatic duct probably remained intact, but since the support of surrounding pancreatic tissue was removed, this duct gradually dilated. At a certain stage of tension, the sac ruptured and its contents escaped into the lesser omental bursa. Thus, the large cystic mass was formed, which at one time contained as much as 3,000 c.c. of fluid. This huge mass lay behind the stomach, pressing it against the anterior abdominal wall and causing obstruction to the passage of food. Drainage was difficult to maintain and attempts to obliterate the cavity with chemicals were unsuccessful. The partial epithelial lining was no doubt responsible for the continued secretion. Continuous drainage had been established several weeks before the final operation was performed. At this operation the sac contained only about two ounces of fluid and it was possible to enucleate it entirely.

Hydrops of the gallbladder had occurred during the course of events, due to gradual stenosis of the cystic bile duct, which was no doubt traumatized at the time of the original injury. Drainage of the gallbladder gave clear mucus, without bile. The gallbladder was removed at the final operation.

The removal of the tail of the pancreas, distal to the point of injury, had no untoward effect upon the patient's recovery. Diabetes is an infrequent accompaniment of these cysts, even with extensive pancreatic injury. In our case, sugar appeared in the urine only during the time when glucose was being administered intravenously postoperatively.

It is interesting that the only enzyme present in the cyst fluid was a lipase. No amylolytic or proteolytic enzymes were found. In reports appearing in the literature, all three enzymes or any one or two of them may

be present. The presence of enzymes is not pathognomonic of pancreatic cysts, since enzymes, particularly sugar-splitting enzymes, may be found in peritoneal and other exudates.

Traumatic cysts, or pseudo-cysts, of the pancreas are reported not infrequently in the literature. They are probably the most frequent type of pancreatic cyst. Moynihan was one of the first to call attention to the fact that many so-called pancreatic cysts are in reality effusions of fluid into the lesser omental bursa, and should therefore be designated pseudo-cysts or peripancratic cysts. These cysts may or may not contain an epithelial lining. It is argued that if they are formed from dilatation of a duct or gland acinus, they should have an epithelial lining. However, it is found that the lining may disappear, possibly from pressure. Therefore, the presence or absence of epithelium within the cyst does not give us any information as to the origin of the cyst.

905 Medical Arts Building.

CITROCARBONATE, ACETONYL, SALICIONYL, BROMIONYL, BROMIONYL WITH ACETYL-SALICYLIC ACID, BROMIONYL AND BARBITAL, OINTMENT SCABICIDE, KEROLYSIN, SUPER D COD LIVER OIL; PRODUCTS OF THE UPJOHN COMPANY, NOT ACCEPTABLE FOR N.N.R.

The Council on Pharmacy and Chemistry reports that for many years the Upjohn Company of Kalamazoo, Mich., has exploited to the medical profession, and indirectly to the public, a large number of pharmacutic preparations. This firm has developed promotion through the agency of "detail men" to a high state of efficiency. Some preparations of the Upjohn Company have in a few instances largely replaced standard non-proprietary products of equal or greater merit, to the financial benefit of the firm and to an equivalent financial detriment to the public. The Council has considered some of the more widely used Upjohn preparations. The Council declared Citrocarbonate, which is stated to be "An alkaline effervescent mixture of organic salts of Lime, Potassium, Sodium, and Magnesium properly balanced," unacceptable for inclusion in New and Non-official Remedies because it is a mixture of semisecret and unscientific composition, containing an excessive number of active ingredients, marketed with extravagant and unwarranted therapeutic claims, under a misleading and uninformative name. Acetonyl, said to constitute "Granular Effervescent Alkaline Acetylsalicylates," and Salicionyl, claimed to be "A granular effervescent salt presenting sodium salicylate in such a way as to reduce the incidence of those unpleasant features which complicate the use of salicylates alone," were declared unacceptable for the same reasons that determined the Council's action in the case of Citrocarbonate. Bromionyl, another granular effervescent salt, is not acceptable for New and Non-official Remedies because it is apparently an unnecessarily complex mixture of semisecret composition sold under a misleading name, and Bromionyl with Acetylsalicylic Acid and Bromionyl with Barbitol are even less acceptable than the parent substance because the differences in the rates of elimination of these substances from the body makes dosage in fixed ratio irrational. Ointment Scabicide, said to contain "the polysulphides of potassium," was declared unacceptable because it is a semisecret preparation, apparently of unscientific composition, marked with a therapeutically suggestive name which has frequently led to self medication by the

public. Kerolysin, which is said to contain "Acid Benzoic 12 per cent, Acid Salicylic 6 per cent, Thymol 1¼ per cent in a suitably adapted ointment base," was declared unacceptable for New and Non-official Remedies because it is an unessential modification of a well known mixture, marketed with unwarranted therapeutic claims under a proprietary, therapeutically suggestive name, uninformative of its essential constituents. Super D Cod Liver Oil, said to be assayed by the U.S.P. method for vitamin A potency and to contain not less than 25,000 units per ounce, and to represent "a vitamin D potency of not less than 10,000 units per ounce, controlled by the McCollum line test . . ." was declared unacceptable for New and Nonofficial Remedies because of its semisecret composition and indefinitely designated vitamin potency and because of its objectionable name. (Jour. A. M. A., May 20, 1933, p. 1597.)

VITAMIN D AND WELL BEING

New problems in relation to the possible function of Vitamin D in promoting bodily welfare continue to arise, despite the commendable progress of recent years. One concerns the uncertainty of the need of supplementing the diet with added Vitamin D if it is liberally supplied with the appropriate mineral constituents, notably calcium and phosphorus. In new studies on animals that were subjected over long periods to extreme calcium deprivation, Templin and Steenbock of the University of Wisconsin found that the introduction of moderate amounts of Vitamin D into the calcium-deficient ration provided considerable protection from mineral losses in a parallel series of rats. The results tend to support the impression of the value of Vitamin D as a food constituent for the adult. The Wisconsin biochemists frankly insist that it is unwarranted to expect that Vitamin D administered in any amount should be able to compensate fully for an extreme lack of calcium or other dietary essentials. As the basal diet was not optimal with respect to protein or phosphorus content, it is possible that the favorable effects of Vitamin D on calcium conservation might have been accentuated if the diet had been improved in these respects also. This is equivalent to the much needed reminder that vitamins are by no means the sole essentials for a healthful diet. (Jour. A. M. A., May 27, 1933, p. 1692.)

D.C.P. 340 NOT ACCEPTABLE FOR N.N.R.

The Council on Pharmacy and Chemistry reports that according to a circular and form letter forwarded by a physician to the Council, D.C.P. 340 is the name under which Parke, Davis & Company markets a preparation of dicalcium phosphate. Firms which have had dealings with the Council as long as Parke, Davis & Company are well aware of the Council's sound objections to the use of letters and numerals for, or in connection with, the names of medicinal products. The product is apparently intended to exploit the current interest in calcium-phosphorus therapy or prophylaxis. The circular cites the work and opinion of Sherman in support of the thesis that ". . . the average American . . . dietary is actually low in both of the factors [calcium and phosphorus]." The Council has held that this thesis is by no means established. New and Non-official Remedies, 1933, p. 129, states: "The average normal diet usually contains just about enough calcium for the needs of the body. . ." While there may be a place in medicine for the use of dicalcium phosphate in some conditions of recognized deficiency, there is certainly no place in rational and scientific therapy for a preparation marketed under such a name as "D.C.P. 340." The Council declared D.C.P. 340 unacceptable for New and Non-official Remedies because it is a preparation marketed under an uninformative name with unwarranted claims of therapeutic or prophylactic value. (Jour. A. M. A., June 3, 1933, p. 1767.)

EDITORIAL

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BUSINESS MANAGER

J. R. BRUCE, Saint Paul

Volume XVII AUGUST, 1934 Number 8

The Duluth Meeting

Our annual meeting held last month in Duluth proved most satisfactory, both from a scientific and an organizational standpoint. The attendance of more than 800 members shows the interest the profession is taking in the ever improving programs.

The annual meeting is the occasion for the reception of the committee reports of activities during the year, so many of which have to do with economic affairs. Most of the long hours of deliberation by the Council and House of Delegates were devoted to so-called medical economics. And well does this subject merit the concentrated attention of county, state and national medical organizations. The past few years have brought forth numerous proposals tending to alter medical practice radically. The present individual relationship existing between patient and physician which includes free choice by the patient of his physician, a relationship which the profession as a whole, and, we believe, the American citizens as a whole, insist upon, is in danger of being disrupted. All innovations in economic phases of practice must be judged from this viewpoint.

The Committee on Medical Economics of the American College of Surgeons drew up certain pronouncements favoring the trial of prepayment methods to provide for the payment of medical costs and gave them publicity just before the American Medical Association meeting in Cleveland. While the recommendations of the committee of the College were rather general and the term insurance was not used, virtually insurance, to be provided not by insurance companies but by some non-specified agency organized on a non-profit basis, was advocated. Inasmuch as the whole subject of insurance covering the cost of medical care is so involved, the American Medical Association took violent exception to any society of specialists speaking for the entire profession of the country. Certainly the American Medical Association should be the organization to propose changes in medical practice. The stand of the American Medical Association was approved by our State Association.

In this connection it will be interesting to observe developments in Michigan, for the insurgent Michigan State Medical Society is seriously considering a widespread plan for providing medical insurance for families with low income.

The institution of medical relief by the FERA was considered important enough to warrant the appointment last year of a special State Committee on this activity. The uncertainty of the permanency of the FERA merits continued close attention on the part of the profession. Although only about 1 per cent of relief funds in the state have so far been allocated to medical relief, the small fees accepted by the profession, while doubtless in many cases serving to tide over a certain number of practitioners, should not be allowed to form a basis for a permanent arrangement. Our State Association secretary is to have an assistant whose attention will be devoted to the operation of the FERA throughout the state.

A study was made by the Committee on Medical Economics of the malpractice situation in the state, and this study is to be continued. Insurance premiums have increased considerably but seem to be justified as there has been a marked increase in malpractice suits in the state in recent years. It was reported that one of the

three companies doing most of this insurance business in the state has had 216 cases on their hands during the past five years. One company showed a deficit of \$41,000 in a recent two-year period. If this state of affairs continues premiums will have to be increased or the insurance companies will cease operating. The cases seem to be grouped about a rather limited number of lawyers and physicians. Any thoughtful physician must realize the inherent possibilities for innumerable suits in the practice of medicine, even when a patient is given service consistent with good practice. Any physician guilty of fomenting an unjustified malpractice suit and testifying against his fellow practitioner is despicable. Apparently the attitude of juries towards insurance companies is much the same in malpractice suits as in automobile liability cases.

Another problem which came up at the State meeting is the dilemma of the State Board of Medical Examiners. The efficient work of this board is going to be hampered in the near future by lack of funds. The fund established by the larger registration fee required the first two years following the enactment of the Basic Science law is rapidly becoming depleted. Legislative appropriation or an increased registration fee will be necessary to continue the good work of this board.

An innovation in constructive prevention of morbidity and mortality in disease will be the publication of a pamphlet by the State Association to assist physicians in treating diabetic patients. An analysis by the Diabetic Committee of the Association has shown a marked increase in the incidence and mortality of the disease in the state in spite of the discovery of insulin. Many unnecessary deaths occur each year due to lack of medical advice and insulin. Each member of the State Association will receive a copy of the pamphlet which is designed for the patient to follow under the physician's direction, and additional copies will be obtainable at a nominal price. The pamphlet should simplify the treatment of the diabetic patient, which has been needlessly complicated in the past.

Observation of the Duluth session indicated that our Association is energetically giving attention to medical problems in the state in an effort to provide the best medical care for its citizens and to safeguard the interests of the profession.

Dr. Coventry, our newly elected president, with his natural ability and years of experience

in State Association affairs, can be counted upon to carry on the progressive spirit of our organization.

One Hundred Million Guinea Pigs

The book with this ingenious title has been much read. The more it is read the better. Much of its contents is known to the profession as a result of the work of the Council on Pharmacy and Chemistry and the Committee on Foods of the A. M. A. There is enough in the volume, however, which is not known to the average medical man to warrant the reading.

The backbone of advertising is the honest presentation of goods to the consumer. Advertising's backbone is in danger of being broken. This fact has justified the Consumers' League, which has come into existence to furnish an unbiased judgment on the value of commodities. The book mentioned is by two directors of the League and the enormous fund of information gathered by the League has been drawn upon to call the attention of the public to the dangers lurking in everyday foods, drugs and cosmetics.

The Federal government has always given more attention to the welfare of live stock than to United States citizens. Perhaps the human animal is supposed to have enough intelligence to care for its own welfare. In this complicated civilization of ours, however, we expect governmental protection where we buy food, drugs or cosmetics. Are we getting it? Apparently not.

Most individuals know that arsenic is poisonous. They do not know what strength of arsenical insecticide is safe for spraying apple trees and that apples are actually sold in the American market which are barred from foreign countries because too much arsenic is present on the skins of the fruit. Nor do they know that the regulation as to the strength of such insecticide established as safe by the Food and Drug Commission is not enforced. The same situation exists as to the sale of dried fruits treated with sulphur dioxide.

The patent medicine industry was supposed to have been dealt a death blow years ago. Nothing is farther from the truth. Millions of dollars are still extracted from the public for what are in the main useless remedies. The advertising of many of these remedies is so misleading and sometimes actually false that it is nauseating to

the medical mind. Doubtless the most harmful phase of such advertising is inducing the public to employ useless remedies for serious diseases.

The case of mercurochrome is taken up in detail in the volume mentioned. When mercurochrome first appeared it was heralded as the long-sought drug which would kill bacteria and spare living cells. Its uselessness as an intravenous antiseptic soon became evident. The medical profession has doubtless been led to place too much reliance on its local antiseptic power in weak aqueous solutions. It certainly is no substitute for the tincture of iodine.

It is probably not known generally in medical circles that impure ether has been sold to hospitals for anesthesia. Apparently, too, there was something to the accusation that rotten ergot was allowed by the authorities to be imported for medicinal use—a procedure to which our attention has been repeatedly called by one Arm-buster.

Several instances of poisoning from cosmetics have been reported in the medical journals. Certainly there is no argument but that depilatories containing thallium and such cosmetics as Lash-lure should be barred.

The volume contains plenty of evidence of the need of more active supervision of the manufacture and sale of foods, drugs and cosmetics. The contention is that the consumer and science should form the basis for the necessary regulatory laws rather than the business interests. A registry is proposed where approval must be obtained as to ingredients and labelling before an article can be sold. Naturally such a proposal will meet considerable opposition.

The medical profession knows too well the wastefulness of self medication and the actual danger in the unrestricted sale of dangerous drugs such as alpha dinitrophenol. A perusal of this book emphasizes the need for a change in the federal control of the manufacture and sale of not only drugs but of such articles as affect the health of the public.

ANTIPNEUMOCOCCUS SERUM

The Council on Pharmacy and Chemistry reports that there has been brought to its attention evidence that with improved preparations and technic the experimental use of antipneumococcus serum containing Type II antibodies or of preparations containing this antibody in combination with Type I is justified. The Council therefore voted to consider the acceptance of these preparations, and voted to inform firms manufacturing the antipneumococcus serum of this decision. (*Jour. A. M. A.*, December 16, 1933, p. 1968.)

Of General Interest

Dr. A. E. Benjamin of Minneapolis has announced that Dr. Edwin G. Benjamin has become associated with him in practice at 1727 Medical Arts Building.

Dr. Charles Betlach is taking a fellowship in anesthesia at the Mayo Clinic following the completion of his internship at the Minneapolis General Hospital.

Dr. Jan Tillisch is taking a fellowship in internal medicine at the Mayo Clinic following his internship and a year in medicine at the Ancker Hospital, Saint Paul.

Dr. Archie Olson of Hendricks, Minnesota, has been awarded a fellowship in the eye, ear, nose and throat department of the University of Chicago, where he is now located.

Dr. Wallace Merritt, following a year's residency in medicine at the Ancker Hospital, Saint Paul, began practicing July 1 at the Gamble Clinic in Albert Lea, taking the place of Dr. Ross Gamble, who recently died.

Dr. Leonard J. Monson of Canby, Minnesota, following the completion of his internship at the Minneapolis General Hospital, is practicing in association with Dr. Peter E. Hermanson at Hendricks, Minnesota.

THANKS TO THE DOCTORS

Commercial exhibitors reported a great many actual sales and a great deal of interest in their products displayed by doctors who attended the annual meeting of the Minnesota State Medical Association. They were particularly gratified by the attention given them by medical visitors from out of the state.

In any case, thanks are due to all of the doctors who took the trouble to spend a portion of their crowded time in Duluth with the commercial exhibitors.

A large and well satisfied section of commercial exhibits goes a long way toward making a successful scientific meeting. Such a section is already established and is growing rapidly for the state meeting in Minnesota.

LASH-LURE

A number of cases of severe poisoning, including one case of blindness, have been reported from the use of a so-called "Eye Brow and Lash Dye" sold by a Los Angeles concern under the trade-marked name "Lash-Lure." The indiscriminate distribution of dangerous drugs by irresponsible persons again emphasizes the need of an extension of the powers of the National Food and Drugs Act. Lash-Lure, according to the A. M. A. Chemical Laboratory, contains a dye of the aniline type. The dangers of using hair dyes of the aniline type, even on the hair of the scalp, is well known to all reputable beauty parlors, and usually such dyes will not be applied if the patient exhibits any sensitivity to the substance. Yet in Lash-Lure we have a potentially dangerous product sold to be applied to the eyelashes. Whether the victims of this preparation have redress at law against either the exploiter of Lash-Lure or the individual beauty parlors responsible for applying it is a matter for the courts to decide. However, money is a poor recompense for the loss of sight. (*Jour. A. M. A.*, September 23, 1933, p. 1016.)

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association

B. J. Branton, M. D.

W. F. Braasch, M. D., Chairman

J. C. Michael, M. D.

Minnesota Leads

Wisdom, discretion and complete harmony marked the 1934 deliberations of the House of Delegates of the Minnesota State Medical Association at Duluth.

Momentous questions of social policy that will profoundly affect not only medical practice but the public weal in the next important years received prompt and thoughtful action at that meeting.

Sessions were disciplined, orderly and peaceable—a state of affairs that pleasantly sets apart the deliberations of organized medicine from those of certain other distinguished professional associations in which the social changes of the last few years have produced only turmoil and disagreement.

Medical men well realize that in order to prevent inroads of influence that would injure the best interests of medicine and would lower present standards, a united front is necessary.

On the basis of the conduct of its House of Delegates in Duluth and its conspicuous achievements of the last ten years, these things may truly be said of the medical profession of Minnesota:

It has steered a straight and clear course in the midst of temptation and distraction.

It works in an orderly manner for common purposes and the public good.

It is now leading all of the states in the United States in the legal protection it has secured for maintenance of professional standards and prevention of licensure for unqualified healers.

For testimony as to Minnesota's leadership in these matters the reader is referred to public statements made by the following distinguished visitors to the meeting: Dr. W. L. Bierring, Des Moines, Ia., president of the American Medical Association; Dr. W. D. Haggard, Nashville, Tenn., former president of the American Medical Association; Dr. F. J. Crockett, past president of the Indiana State Medical Association.

Passed by the House

In two crowded sessions, the House of Delegates considered an unprecedented amount of important business at Duluth.

Outstanding were the following actions, approved by the Council and confirmed by the House:

1. Unanimous endorsement by resolution of the American Medical Association's stand on health insurance—its famous ten point platform for the measure of all medical practice—its rebuke of subsidiary organizations such as the College of Surgeons for taking independent action on social and economic matters in

opposition to the expressed will of the majority of physicians of the United States.

2. The decision to engage a full time field representative of the association, to contribute to the smooth operation of State Emergency Relief Program as it affects the doctors who are doing the work.

Diabetes Pamphlets Approved

3. Decision to publish 10,000 pamphlets on diabetes at the association's expense. These pamphlets have been prepared under the direction of the Committee on Diabetes. They will be distributed to members throughout the state and, through them, to diabetic patients.

Object: To cut down the rising death rate from diabetes, through better education of diabetic patients in the routine control of their disease.

Many other important problems were discussed and essential action taken.

In general, this session left nothing to doubt as to the stand of the Minnesota State Medical Association on the subject of socialization of any sort in the practice of medicine. Organized medicine went away from Duluth prepared to stand firmly by its traditions and to go steadily forward on the lonely but distinguished course demanded of it by the nature of its public service.

It went out from Duluth, also, determined to carry on any essential burden, alone and without aid, if necessary, rather than accede in the slightest degree to socialistic experiment.

Resolution to Back the A. M. A.

The House of Delegates of the Minnesota State Medical Association assembled, heartily endorses the sentiments and principles expressed by the action taken at the recent meeting of the House of Delegates of the American Medical Association at Cleveland in which were clearly stated the fundamental principles which should govern the practice of medicine both now and in the future as formulated in the (1) Ten Points and (2) the resolution that the American Medical Association is the proper body to legislate for and control the forms of medical practice.

We further approve the resolution passed by the House of Delegates of the American Medical Association condemning any attempt on the part of any scientific medical organization whose members are also members of the American Medical Association to dominate or control the nature of medical practice.

Medical Field Worker

A suggestion that a medical field worker might be needed to supervise the machinery of emergency medical relief was made some time ago in these columns. The need for such a functionary was emphasized by the exhaustive report submitted by Chairman N. O. Pearce of the Committee to Contact the State Relief Administration in which the dissatisfaction of officials of the relief administration with some aspects of the present program was specifically cited.

The mission of the field representative, determined upon by the House of Delegates, will be to keep in constant touch with the relief administration on the one hand, and with the doctors all over the state on the other; to avoid unpleasant misunderstandings; to assist in making necessary local adjustments and, in general, to oil the machinery of medical relief so that the most efficient and satisfactory care will be available to relief families with the least possible expenditure of money by the government and the least friction on the part of anybody who is a party to the program.

The successful working of this medical relief program may well mean the preservation, against odds, of our ancient American traditions in medical practice.

For Information on Relief

Every doctor who is doing relief work in Minnesota is referred for a complete, well considered review of the New Deal relief program as it affects health and medical practice to the forty page report of the Committee to Contact the State Relief Administration.

All of the figures for expenditure of relief money for medical care are available by month and by county in that report; also the plan of operation as outlined in federal bulletin No. 7, together with explanations and interpretations. The report contains a brief account and estimate of every phase of the program that in any way involved physicians—CCC camps, CWA, Transient Camps, the Child Health Recovery program. It will be printed soon in MINNESOTA MEDICINE.

With the information provided in this report and a special medical representative in the field, available to iron out any special differences that may arise between physicians and relief workers, the prospect is bright for smooth, efficient and satisfactory medical relief in the next year.

Future Developments

The Committee on State Health Relations, reporting on the general state of care of indigent in the state, looks forward to several years in which this emergency medical program will take the place of any local arrangements between county commissioners or town boards and physicians for care of the poor. Chairman Theodore Sweetser of Minneapolis hopes that the experiences of these years will lay an excellent background for much better local relations and local arrangements when the emergency is over and federal relief money is withdrawn.

Thanks to the action of the House of Delegates at this meeting, every possible step will be taken to realize this hope, and to avoid ugly quarrels over medical service and its price with laymen—quarrels that cannot avoid damage to the cause of good medical practice and practitioners, no matter where the rights in each individual altercation may lie.

Education for Diabetic Patients

Decision to publish the diabetes pamphlet of the Committee on Diabetes illustrates an interesting and important new phase of association work.

The formation of special state association committees for the promotion of special public health problems is not new. There have been cancer and heart committees for many years.

But with the formation of the Committee on Diabetes under the enthusiastic chairmanship of Dr. Russell M. Wilder of Rochester a year ago, this particular phase of the work of organized medicine in Minnesota took on a new life.

There is no better agency and there are no better facilities available for public health education than those of medical organization.

It is axiomatic that the doctor himself is the best informed public health teacher. Yet how often such problems as that presented by the rising diabetes death rate are neglected by the doctor! And by his neglect the field is left wide open for lay societies to function.

In Medical Hands

It is greatly to the credit of the association and the new Committee on Diabetes, that leadership in the public health campaign to control diabetes is now definitely in medical hands and will remain so.

Diabetes now occupies tenth place among causes of death in Minnesota. The death rate per one hundred thousand has increased from 16.40 in 1915 before the discovery of insulin to 22.37 in 1932 and the rate is rising faster than the cancer or the heart rates. These astonishing figures were read to the convention by a committee member, Dr. W. A. Stafne of Moorhead.

The trouble is with doctors as well as diabetic patients. The doctors do not always sufficiently instruct and advise their patients on the daily regimen essential to control of diabetes.

They Rely on Quacks

The patients, on the other hand, either fail to seek legitimate medical attention entirely, putting their faith tragically upon patent medicines or quacks, or they fail to carry out the doctor's instructions. Sometimes they are too poor to buy insulin.

Insulin can now be secured for relief families who need it, through the doctor who treats them under the plan for emergency medical relief.

The best attack upon the problem to teach diabetic patients how to control their disease was thought by the committee and the House of Delegates to be a pamphlet written in plain, untechnical English which

the doctor could put in the hands of his diabetic patients.

The proposed pamphlet will be in the hands of the printer shortly. Ten thousand of them will be printed for distribution without charge to members of the association. Those who want additional copies when the original ten thousand are exhausted will be able to secure them at small cost through the association.

Preventing Deafness

The Committee on Prevention and Amelioration of Deafness, organized a year ago, is attacking the neglected problem of deafness among school children.

Like the Committee on Diabetes, this committee is stepping in to take the lead in essential public health work. Its program for finding the children with impaired hearing in the schools has already begun, in co-operation with school authorities, and under the direction of its chairman, Dr. Horace Newhart of Minneapolis. The committee and its work received the enthusiastic endorsement of the House of Delegates at Duluth.

Limiting Physicians

How shall we approach the difficult problem of limiting the number of physicians licensed each year to practice in Minnesota?

In its report offered to the House of Delegates at Duluth the Committee on Limitation of Medical Licenses made the guarded recommendation that the Legislative Committee, if it should make any attempt to change the present statute governing the State Board of Medical Examiners, might promote the incorporation of a clause giving the Board discretionary powers as to the number to be licensed to practice medicine each year in the state.

The Reference Committee, backed by the House of Delegates, hesitated to go on record favoring the recommendation. It was inclined to agree with Dr. F. J. Savage, president of the association, who took occasion in his president's address to point out emphatically that limitation should begin before candidates for license approach the licensing board. The House of Delegates referred the report and recommendation back to the committee with instructions to confer with the Committee on University Relations and the Committee on Public Policy and Legislation for further study and a report next year.

Interesting figures presented in the report:

Two thousand, nine hundred twenty-six doctors are licensed to practice and register annually in Minnesota (474 of these live in bordering cities in neighboring states).

In addition, 4,681 doctors are licensed to practice in Minnesota but live outside the state and do not register annually. These men, if alive and well (many have been traced to other states, Canada, Europe) could move back to Minnesota to practice at any time.

In 1930 (peak year since 1927) 201 physicians were licensed to practice.

In 1934 the total had dropped to seventy-three.

The committee says: "Inasmuch as the ratio of phy-

sicians to population in Minnesota is even now more than adequate, a figure not exceeding the present ratio should be maintained."

In view of the fact that the number of licentiates has been greatly reduced in the past year, and since so many factors are involved in this problem, the Reference Committee rightly hesitated to approve any drastic recommendation at this time.

Malpractice Suits

A general increase in malpractice insurance premiums was reported by Dr. B. J. Branton, of Willmar, committee member, as part of a study of the subject made under the committee's auspices.

Insurance companies amply justify the increase on the unquestionable and disturbing increase in the number of malpractice suits.

Dr. Branton: "Thorough familiarity with all the laws governing medical practice on the part of physicians would help materially to cut down the number and size of verdicts.

"Good work, constant study, post-graduate courses to become better practitioners, eliminate many chances for the bringing of malpractice suits."

Loyalty to each other on the part of physicians and a disposition to unite in defense of the defendant in such an action whenever such a defense is not unethical and impossible was urged by Dr. Branton.

The Reference Committee and House of Delegates rejected a recommendation to the effect that members in good standing of the state association should be subject to censure or expulsion if they testified against other members in a malpractice action. They based their objection on the fact that situations may arise in which one member can not avoid appearing against a fellow.

The recommendation, offered in the form of a resolution, was withdrawn.

Group Insurance

Group annuities and group life insurance are not feasible for members of medical associations, according to Dr. J. F. Michael of Minneapolis, committee member, reporting on these forms of insurance. Neither are health and accident insurance or pre-payment hospital insurance.

"Pre-payment hospital insurance is disapproved on principle in many quarters, especially for medical groups. No recommendation is made."

For Medical Preparedness

The following recommendations by the Committee on Military Affairs were endorsed by the Reference Committee and accepted by the House of Delegates.

1. That an active committee be appointed to contact the younger men in the county societies and those young men just coming in to the county societies and urge them to apply for appointment to the medical reserve. . . .
4. That physicians, having applied for commissions be encouraged to perfect themselves through the cor-

respondence courses authorized by the Medical Corps so that they may advance in proficiency and rank. This in order that we may have an active and trained medical personnel for a national emergency.

"The civilian physician is the only one who imagines that he can step directly from civilian life into the army and be efficient in the practice of his profession," said this committee. "The only place where the two are allied is in the wards and operating rooms of Base Hospitals. In all other branches the civilian physician is a total loss."

No Action on R.O.T.C.

Two other recommendations involving endorsement by the medical profession of the retention of the R.O.T.C. at the University and also a study of the advisability of re-establishing the Medical Department in the R.O.T.C. were referred back to the committee on the advice of the Reference Committee. These are matters, in the opinion of the Reference Committee, on which our Association can take no action.

Committee Functions

The Minnesota State Medical Association is rapidly outgrowing the committee structure that served it admirably for many years.

A Committee to Study the Functions of Committees was accordingly appointed by the Council last February and reported at Duluth. At its recommendation, the House of Delegates empowered the Council to make changes.

These changes look toward the coordination of the functions of several committees, elimination where there is duplication, and a better definition of purposes and functions.

It is suggested, for instance, that all committees appointed by the president terminate with the expiration of his office. All new committees, not authorized in the constitution and by-laws, should terminate also, unless otherwise authorized by the House of Delegates.

Standing committees necessary to carry on the continuous work of the Association are to be created by the Council and new appointments to these committees are to be made by rotation at stated periods.

Lines Should Be Drawn

It is especially recommended that a sharp line be drawn between scientific and other committees and that a Committee on Economics be appointed by the Council to consist of five members and to supervise the work of all committees to study economic problems of any sort (the Committee on Limitation of Medical Licenses, et cetera), these latter committees to be subdivisions of the supervising Committee on Economics.

Another important change asked by the Committee was to make the position of Secretary of the Association officially that of general manager of arrangements for the annual meeting. The Secretary is therefore to be officially responsible for housing, promotion, for all exhibits—scientific, technical, commercial—and for the

Scientific Cinema, cooperating, of course, with such members as he may select as assistants and advisors.

By the same alteration, the Committee on Scientific Assembly becomes responsible for the scientific program, alone.

Affiliate Members

At present there are seventy-seven affiliate members of the Minnesota State Medical Association.

They represent a reduction in income of \$1,155.00.

Forty-two members will be seventy years of age and eligible to affiliate membership within a short time. In addition, there are fifty-three members who are now between sixty-five and sixty-nine years of age and will be eligible within the next five years for affiliate membership.

If all the members now over sixty-five apply for affiliate membership the income of the Society will be reduced another \$1,425, making a total of \$2,580, less the cost of sending these affiliates MINNESOTA MEDICINE.

This is a sizable drop in income and may necessitate an increase in the dues of active members.

The above figures were submitted to the House of Delegates by the Committee on Affiliate Membership. The Committee recommended:

1. That a year's further study be put upon the whole question before any definite action to change the age of eligibility to affiliate membership be taken.

2. That affiliate membership be regarded, in the meantime, as an honorary membership, not as an automatically accruing privilege for all who reach a certain age.

That the question of precise age limit is secondary to the fostering of this sentiment concerning affiliate privileges.

Minnesota State Board of Medical Examiners

Duluth Pharmacist Found not Guilty of Practicing Healing

State of Minnesota *vs.* Sophia Stryboya, also known as Sophia Stryboya Sikoparija

Mrs. Sophia Sikoparija, who operates a drug store on Commonwealth Avenue in that portion of Duluth known as Gary, was found not guilty by a jury in the Court of the Honorable E. J. Kenny, Judge of the District Court, on May 28, 1934.

The information filed against the defendant charged her with examining and suggesting a form of treatment for one Mrs. Zorka Griak, who also lives at Gary, and that this was done for a fee or compensation. Mr. and Mrs. Griak, who were witnesses for the State, testified that the defendant on two occasions took the temperature and pulse of Mrs. Griak. This was denied by the defendant, who admitted selling to Mr. and Mrs. Griak the fourteen items of pills, powders and liquid medicines that were introduced in evidence, but contended that they were sold either on a prescription or

on a written slip presented by the purchaser calling for the specific articles.

Judge Kenny, in his charge to the jury, stated that in so far as doing those things which the Basic Science Law defines as the practice of healing "a pharmacist is in no different position than a layman, and cannot do those things any more than a layman can."

Northwest Hair Clinic Incorporated, Dissolved

On June 4, 1934, the Honorable Arthur W. Selover, Judge of the District Court for Hennepin County, made an order dissolving the Northwest Hair Clinic, Incorporated.

This clinic had been incorporated in 1932 for the purpose of owning and operating "beauty shops and hair and skin clinics" (MINNESOTA MEDICINE, June, 1934, page 353). The corporation advertised extensively that its work was done under "strict medical supervision."

On June 15, 1934, a certified copy of Judge Selover's order was filed with Mike Holm, Secretary of the State of Minnesota, which terminates the corporate existence of this corporation.

Unlicensed Chiropractor Pleads Guilty to Violating Basic Science Law

State of Minnesota *vs.* Willits

On July 9, 1934, Charles A. Willits, Maple Plain, Minnesota, entered a plea of guilty to practicing healing without a Basic Science certificate before the Honorable Mathias Baldwin, Judge of the District Court at Minneapolis. Judge Baldwin, after ascertaining the facts, sentenced the defendant to ninety days in the Hennepin County jail, but stayed the sentence for one year upon the condition that the defendant absolutely refrain from practicing healing unless he is properly qualified and licensed to do so.

The defendant, a middle aged man, claims to be a graduate of a chiropractic school at Davenport, Iowa. He informed Judge Baldwin that he was licensed to practice chiropractic in the State of Wisconsin, but not in Minnesota. The defendant formerly lived at Superior, Wisconsin, but for some time has been living on a small farm just south of Maple Plain in Hennepin County, Minnesota. Willits admitted to the Court that he had been treating people for various ailments, and that he had received compensation for his services. When the defendant was questioned by the Court as to

why he had not taken the Basic Science examination, he replied that he did not have a high school education and therefore was disqualified under the law.

Albert Lea Chiropractor Pleads Guilty to Violating Minnesota Basic Science Law

State of Minnesota *vs.* Hale

J. F. Hale, forty-five years of age, entered a plea of guilty on July 11, 1934, to a charge of practicing healing without a basic science certificate, before the Honorable Norman E. Peterson, Judge of the District Court at Albert Lea. Hale, who recently came into the State of Minnesota from Iowa, claimed that he graduated in December, 1933, from the Palmer School of Chiropractic at Davenport, Iowa. However, he passed over very lightly the formality of taking the Basic Science examination and proceeded to practice for several weeks at Glenville, Minnesota, and more recently at Albert Lea.

On July 7, 1934, a warrant was issued for his arrest charging him with practicing healing without a basic science certificate. At that time Hale maintained an office at 512 South Broadway, in Albert Lea, and had a large sign painted on his window "Hale—Chiropractor." When arraigned before O. F. Missman, Justice of the Peace, he demanded a preliminary hearing and informed the Court that he was a member of the Chiropractic Health Bureau. He also stated that they had legal counsel in Indianapolis, Indiana, and that they would defend him. Hale was given a hearing, held to the District Court under \$500.00 bail, and placed in the Freeborn County Jail in default of furnishing his bail. After several days in jail Hale decided to plead guilty and was sentenced by Judge Peterson to pay a fine of \$100.00 or ninety days in jail. Hale agreed not to practice in the State of Minnesota unless he was licensed and expressed a desire to return to the State of Iowa. Under these conditions Judge Peterson suspended the sentence and placed the defendant under probation to Sheriff Helmer Myre of Freeborn County, and he is to report to the District Court at Albert Lea on the opening day of the September, 1934, term. Hale seemed to be under a misapprehension that chiropractors who were arrested in Minnesota for practicing healing in violation of law, were permitted to continue to practice while they were awaiting trial. He was emphatically informed that such was not the case.

Splendid cooperation was shown in the handling of this case by Elmer R. Peterson, County Attorney of Freeborn County, and Helmer Myre, Sheriff.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

Medical Broadcast for the Month

The Minnesota State Medical Association Morning Health Service.

The Minnesota State Medical Association broadcasts weekly at 11:00 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of August will be as follows:

- August 1—Crippled Hearts.
- August 8—Price of Worry.
- August 15—Infantile Paralysis.
- August 22—Unseen Enemies of Children's Health.
- August 29—How Radium Acts.

New State Officers

Dr. William A. Coventry of Duluth was elected president of the Minnesota State Medical Association at the 81st annual session of the association's House of Delegates at Duluth in July. Dr. Coventry will take office in January, succeeding Dr. F. J. Savage of Saint Paul.

Other officers elected at the meeting are: Dr. A. G. Chadbourn, Heron Lake, first vice president; Dr. E. S. Boleyn, Stillwater, second vice president; Dr. W. H. Condit, Minneapolis, treasurer (re-elected) and Dr. E. A. Meyerding, Saint Paul, secretary (re-elected).

Dr. B. S. Adams of Hibbing was elected to fill out the term of Dr. Coventry as councilor of the 9th district. Other councilors whose terms expired this year and who were re-elected for new terms are: Dr. H. M. Workman, Tracy, for the 3rd district; Dr. George Earl, Saint Paul, for the 5th district; and Dr. W. W. Will, Bertha, for the 7th district.

Next year's meeting of the association will be held at Minneapolis, the delegates decided. Preparations are already under way for the largest meeting in the history of the association.

A total of 1,500 physicians, Auxiliary members, nurses and exhibitors was registered at the Duluth meeting.

Olmsted-Fillmore-Houston-Dodge Society

A hobby show of the Olmsted-Fillmore-Houston-Dodge County Society was held last month at the Rochester Country Club. Each member was requested to display his special hobby and a novel exhibit was arranged on the clubhouse veranda of etchings, paintings, unusual photography, wood carving, sculpture, coins, pottery and guns.

Dr. Vinson's hobby of gardening was depicted by a figure of a man made up from a dark shirt, plaid plus fours, garden instruments protruding from the arms and legs of the garments, a spade being used for the head.

Dr. L. F. Sutton of Mazeppa exhibited a 200 year old Belgian print. Dr. C. G. Sutherland had his notebook containing records of stories heard.

Leica photographs, enlargements made from motion picture films, developed and mounted on large panels by Drs. D. M. Masson and A. H. Sanford attracted much attention. Considerable talent in oils was displayed in Dr. J. E. Crewe's exhibit of paintings, "Dr. Braasch's Home," "Scene on the North Shore," "Lake Superior Fog," and "View from Mrs. Kahler's Garden."

Dr. F. A. Willius' hobby was depicted by eleven pen

and ink sketches of old streets, quaint architecture, home scenes and bridges.

Old coins from Europe, Asia and the United States enclosed in a glass case constituted Dr. A. M. Snell's contribution. This hobby had led him to collect also some old-fashioned warming pans.

Dr. M. C. Piper is interested in collecting pioneer relics and displayed an old millstone found on his grandfather's estate near Mankato, a grain shovel found near White Water and a solid walnut mould, hand made, used for casting metal wheels.

Quite a display of old firearms from Italy, Austria, Germany, Czechoslovakia, and elsewhere was presented by Dr. Louis B. Wilson.

Among the displays which should be mentioned was the collection of exquisite Chinese embroidery and clothing gathered by Dr. Walter H. Judd during his several years' sojourn in China.

A good number of members played golf in the afternoon, which was followed by dinner and dancing. The hobby show was in charge of Dr. Sanford and Dr. Piper, while the program was arranged by Drs. Snell, Pollock and Prangen. A committee of the Women's Auxiliary of the medical society, consisting of Mrs. F. P. Moersch, Mrs. O. C. Heyerdale and Mrs. L. M. Randall, assisted.

Wabasha County Society

The sixty-sixth annual meeting of the above named society was held at Lake City, on Thursday, July 5, 1934. There were twenty-five in attendance.

The program and entertainment committee consisted of Dr. R. C. Radabaugh, president of the society, and the four Lake City members. Dinner was served at Hotel Lyon, and a boat ride on Lake Pepin was given the ladies in attendance in the afternoon.

At the business session, the following officers were chosen for the coming year: President, Dr. R. C. Radabaugh, Hastings (re-elected); Vice President, Dr. C. G. Ochsner, Wabasha; Secretary-Treasurer, Dr. W. F. Wilson, Lake City; State Delegate in 1935, Dr. W. B. Stryker, Plainview; Alternate, Dr. D. S. Fleischauer, Wabasha; Censor (for three years), Dr. W. J. Cochrane, Lake City.

It was voted to hold the next annual meeting at Wabasha.

Dr. E. W. Ellis of Elgin, a newly located physician in the county, was elected to membership.

Dr. F. J. Savage of Saint Paul, President of the State Medical Association, and Dr. H. Z. Giffin, of Rochester, Councilor for this district, gave talks covering subjects pertaining to the progress and welfare of the medical profession.

A resolution was passed providing for the proper marking of the grave of Dr. H. N. Rogers, a pioneer physician in the county, one of the charter members of the Wabasha County Medical Society, at one time a practitioner in Lake City, a veteran of the Civil War, who died at Farmington in 1926 and whose body now lies buried in Lakewood cemetery, Lake City.

At the scientific session the following program was presented:

R. C. Radabaugh, M.D., Hastings, President of the County Society, "Pioneer Medical Conditions in the County," "Fecal Impaction Following Cholecystitis."

F. J. Savage, M.D., Saint Paul, President State Medical Association, "The Work of the State Medical Association During the Past Ten Years," "Fractures of the Humerus."

E. Covell Bayley, M.D., Lake City, "Report of Operation for Strangulated Hernia on a Four Weeks Old Premature Infant."

J. Grafton Love, M.D., Mayo Clinic Staff, Rochester, "The Treatment of Head Injuries."

W. F. WILSON, Secretary,
Lake City, Minn.

Southern Minnesota Medical Association

The annual meeting of the Southern Minnesota Medical Association will be held August 13, 1934, at Mankato. The scientific program which here appears will be held at the Teachers College. Luncheon will be served at the College, to be followed by the annual business meeting. In the evening a banquet will be held at the Country Club, with addresses to be announced later.

The officers of the Association consist of Dr. M. C. Piper, President; Dr. S. A. Slater, Vice President; Dr. W. H. Valentine, Second Vice President; Dr. H. C. Habein, Secretary-Treasurer.

Scientific Program

- 8-9 a. m. Mankato Hospital. Clinics and demonstrations by Mankato Physicians.
 9 a. m. Backache: E. T. EVANS, Minneapolis
 Discussion: L. W. CLARK, Spring Valley
 A. E. BENJAMIN, Minneapolis
 Dysmenorrhea: L. W. BARRY, St. Paul
 Discussion: A. W. SOMMER, Elmore
 L. J. STACY, Rochester
 Abdominal Pain: OWEN WANGENSTEEN, Minneapolis
 Discussion: L. A. WILLIAMS, Slayton
 I. J. SCHOTTLER, Dexter

- Headache: H. W. WOLTMAN, Rochester
 Discussion: W. L. BURNAP, Fergus Falls
 A. L. VADHEIM, Tyler
 Itching: L. A. BRUNSTING, Rochester
 Discussion: J. F. SCHAEFER, Owatonna
 J. K. ANDERSON, Minneapolis
 Diarrhea: P. W. BROWN, Rochester
 Discussion: A. J. CHADBURN, Heron Lake
 H. J. LLOYD, Mankato
 Hematuria: GILBERT J. THOMAS, Minneapolis
 Discussion: A. E. SOHMER, Mankato
 BEN GALLAGHER, Waseca
 Irregular Pulse: A. R. BARNES, Rochester
 Discussion: C. KOENIGSBERGER, Mankato
 C. B. MCKAIG, Pine Island
 2 p. m. Surgery in Pulmonary Tuberculosis: T. J. KINSELLA, Oak Terrace
 The Management of Essential Hypertension: E. L. TUOHY, Duluth
 Functional Disorders of the Gastro-Intestinal Tract: ARTHUR E. HERTZLER, Halstead, Kansas
 End-Results in the Malarial Treatment of Dementia Paralytica: JOSEPH C. MICHAEL and BURTON P. GRIMES, Minneapolis

TRANSACTIONS of the MINNEAPOLIS SURGICAL SOCIETY

ANNUAL SYMPOSIUM on CANCER*

Devoted to the Occurrence of Cancer in Private Practice in Minneapolis
 and the Available Means of Treatment

MEETING OF APRIL 5, 1934

The President, DR. KENNETH BULKLEY, in the Chair

DR. J. FRANK CORBETT: Radium is recognized as a much used adjunct in the treatment of cancer and we have long felt the need of a survey of the available radium in Minneapolis for the treatment of private patients. Radium is used in the form of emanations and also in the small tubes of the actual radium salt which are designed for local application. We do not have a radium emanation plant in Minneapolis where emanations are available for the treatment of private patients although we do have a very nearly ideal emanation plant at the University of Minnesota Cancer Institute for the treatment of such patients as may enter the Cancer Institute. The facilities of this institute, however, are not available to the surgeons not connected therewith. Dr. Martin Nordland has been appointed Chairman of the Subcommittee to survey the available radium in private hands in Minneapolis and this survey has revealed a surprisingly large amount of radium in this community. Dr. Martin Nordland.

REPORT ON THE USE OF RADIUM AS AN ADJUNCT TO SURGERY WITH SURVEY OF FACILITIES FOR RADIUM THERAPY IN MINNEAPOLIS

DR. MARTIN NORDLAND: The medical profession has begun to realize that radium has its place in the armamentarium of the surgeon, that surgery is a useful adjunct to radium therapy, and that, although treatment by radium alone has a definite place, much can be done by a combination of methods which cannot be accomplished by either alone.

Most of the malignant diseases for which radium is used have hitherto been treated by surgical means and it is of the greatest importance that the medical profession should realize where radium *can help*, where *supercede* and where *hinder* the surgeon. It is inevitable that in many instances radium therapy and surgery should overlap.

It is only within the past six years that the *knowledge of the physics* of radium has been brought to bear on the therapeutic measures. Because of this knowledge radium therapy has been put on a more rational basis, but much has yet to be accomplished before any rules can be laid down.

The knowledge of the reaction of certain kinds of tumors to roentgen rays and radium has led Dr. Desjardins to suggest a method for the identification and classification of tumors which, while not so broad as pathologic methods, may be useful. He cautions that in spite of the excessive faith of many physicians in competent pathologists, one cannot rely too blindly on their verdicts, particularly when conflicting with physical, clinical and roentgenologic data.

The method suggested is based on the fact that each variety of cell in the body has a specific range of sensitiveness to roentgen rays and radium. Although the cause for such specificity has not yet been determined, the sensitiveness peculiar to each kind of cell appears to be related chiefly to the natural life cycle of the cell. It has been noted, for example, that the lymphocyte, which has the shortest life cycle, is also the most radio-sensitive, while the nerve cell, which has the longest life cycle, is also the most radio-resistant. Cells have

*Continued from the July issue.

been classified by Desjardins according to their radio-sensitiveness in the following order:

1. Lymphoid cells (lymphocytes).
2. Polymorphonuclear and eosinophilic leukocytes.
3. Epithelial cells:
 - (a) basal epithelium of certain secretory glands, especially of the salivary glands.
 - (b) basal epithelium (spermatogonial cells) of the testis and follicular epithelium of the ovary.
 - (c) basal epithelium of the skin, mucous membranes and certain organs, such as the stomach and small intestine.
 - (d) alveolar epithelium of the lungs and epithelium of the bile ducts (liver).
 - (e) epithelium of tubules of the kidneys.
4. Endothelial cells of blood vessels, pleura and peritoneum.
5. Connective tissue cells.
6. Muscle cells.
7. Bone cells.
8. Nerve cells.

The radio-sensitivity of the epithelium of the skin is found about half way between the lymphocyte on the one hand and the nerve cell on the other. The different in susceptibility is sufficient to enable one to distinguish readily between the two.

Therefore, general rules can be laid down as to the effect of radiation on tissues which are sensitive to its action, since it is certain that tissues *vary in their sensitivity to radium*. The probable effect of radiation can be foretold if certain factors as to the structure of the tumor are obtained from biopsy.

Generally speaking, tumors in which the cells have great reproductive power (embryonic) are radio-sensitive while tumors in which the cells are highly differentiated are radio-resistant. A *clear distinction* must be drawn between a marked *radio-sensitivity and curability*. The non-differentiated radio-sensitive type spreads rapidly and gives rise to early metastasis with an associated grave prognosis. It is easy to cause clinical disappearance but recurrence is common.

An important factor in reducing radiosensitivity is *infection*. The reason for this is not known but radiation increases inflammation and the effect of treatment on an infected growth is often to induce a flare-up without effect on the tumor itself. In cases of carcinoma of the cervix, much is gained by preliminary local treatment. *Metastases* are also always more resistant to treatment than the primary lesion.

The *latent period*, that is the period between irradiation and changes in the tumor, varies within wide limits (hours to weeks). Whereas lymphoid cells are rapidly influenced by moderate irradiation and undergo more or less marked inhibition of mitosis and degenerative changes within from half an hour to three or four days, corresponding changes in epithelial cells are caused only by a much longer exposure to the rays and changes do not become apparent for a week or even longer. In this connection may be mentioned *delayed radium burns*. These are common in radio-resistant tumors. The burn appears as an ulcer surrounded by hard indurated edematous tissue and covered by an adherent offensive yellow gray slough. This should not be confused with the carcinoma.

The history of radium as a therapeutic agent is so short that it is not possible to describe the more recent advances that have been made without correlating them with the early story of radium. The story of radium begins with the discovery of radio-activity by Henry Becquerel in 1896, followed in 1898 by the discovery of radium by Monsieur and Madame Curie, who analyzed Becquerel's pitchblende further. They found that it contained some radio-active minerals three or four times more radio-active than could be accounted for by the uranium content. They concluded that the ore must contain some other substance. In 1898 they

published the results of their investigation and claimed the discovery of a new element which they called radium. The announcement came on Christmas day and obtained for them a half share in the Nobel prize for that year.

The amounts of radium produced by early workers were infinitely small. Three grams annually came from Joachimsthal, Bohemia, which country set up the first radium monopoly. This amount was mainly used for experimental purposes and the price changed from \$10,000 per gram in 1904 to \$150,000 in 1910. The United States then began to produce the only radium available to the world from Carnotite mined in Utah and Colorado. A Pittsburgh capitalist, Joseph Flannery, whose sister had died of cancer, organized the Standard Chemical Company in 1912 and from that time until 1922 produced four-fifths of the world supply of radium. In 1913 ores rich in uranium were discovered in the Belgian Congo, but it was not until 1921 that the full importance of this discovery was realized and it was not until three years later (1924) that Belgium set out to break the radium market. By 1926 Belgium had complete control. From that time the price of radium began to fall, dropping from \$170,000 to \$50,000 per gram. Of the world's 700 grams or more, some 400 grams have been sold by the Belgians.

There has recently been discovered in Alberta, Canada, in the region of Great Bear Lake, an ore exceedingly rich in uranium. Great Bear Lake mines may kill the monopoly and shoot down the price of radium. The price may fall, but the probable solution is that Canada and Belgium will compromise on a price profitable to both and radium will remain a luxury for those who can afford to die expensively.

Quantity and Location of Radium.—The world, so far, has produced only about 700 grams (one and three-fourths pounds). Its great value makes its location, for the most part, possible.

Location	Grams	Grams
United States		
287 hospitals	90	
414 physicians	35	
9 laboratories	6	
Estimated private and industrial.....	107	
Belgium		238
Czechoslovakia		160
France		55
England		51
Sweden		42
Denmark		8
Argentina		4
Unaccounted		2
		140
Total		700

The State of Minnesota possesses 4,512.3 mgm. of radium while the private physicians and hospitals of Minneapolis have 945 mgm. According to the statements of authorities in France and Sweden, two grams of radium should be available for each million population or for each 1,000 deaths from cancer. Minneapolis, therefore, has sufficient quantity for its 500,000 people.

In common with most new and startling discoveries, radium therapy has suffered from over-enthusiasm on the part of its advocates and from hasty criticism by its opponents. This is especially true in its relation to cancer, where radium has been hailed by the lay press as a cure-all and the public encouraged to believe that it would do all things. While irradiation is a "treatment" that has a definite effect upon cancer, to date its effect has been slight, since 83 per cent of all cancer patients die from cancer. Radium in incompetent hands is a dangerous agent and may be as perilous as cancer itself.

We have with us tonight a group of men who have had considerable experience in the practical applica-

tion of radium. Dr. Charles R. Drake, Director of the Laboratory at the Swedish Hospital for a great many years, is known to most of you and because of his wide experience in the use of radium I would like to have him speak to you with reference to radium in uterine malignancy. I am pleased to introduce Dr. Drake to you.

UTERINE MALIGNANCY

DR. CHARLES R. DRAKE: Uterine malignancy is the most frequent primary malignancy occurring in women, being from 25 to 30 per cent of all such malignancies. These malignancies consist of carcinoma and sarcoma. Sarcoma is of such rare occurrence that it will not be considered in this discussion, although the treatment of sarcoma is essentially the same as that of carcinoma. Uterine malignancies occur most frequently in the fourth, fifth or sixth decades of life, but occasionally they occur between the ages of twenty and thirty and in the aged.

Uterine carcinomas may be classified according to one of three methods: (1) pathologic type; (2) degree of malignancy; (3) anatomic situation: (a) location; (b) extent of growth.

1. The pathologic types consist of: (1) the adenocarcinoma; and (2) the epidermoid carcinoma. About 10 per cent of all uterine carcinomas are adenocarcinoma and most of these occur in the fundus of the uterus. Less than 5 per cent of the carcinomas of the cervix are of the adenocarcinomatous type. The epidermoid or squamous cell type of carcinoma rarely occurs in the fundus. In the cervix it varies in cell morphology to such an extent that it is rather difficult to adequately describe. Suffice it to say that all types of epidermoid cells may be found. The irregularity of growth is protean but all are malignant.

2. Based upon the inherent appearance of the malignant cells the carcinomata have been classified according to their malignancy (Broders' classification), grades one, two, three and four, grade one being the least malignant, grades two and three of moderate malignancy, and four, of the highest degree. However, in the treatment of malignancy, all grades must be considered potentially vicious and should be treated all alike.

3. The anatomic classification as formulated by the Cancer Commission of the League of Nations and reported by the Radiological Sub-commission of that body is substantially as follows:

Stage 1. The growth is limited to the uterine cervix. The uterus is freely movable.

Stage 2. The lesion spreads into one or more of the fornices with or without infiltration of the parametrium adjacent to the uterus, the uterus retaining some degree of mobility.

Stage 3.

(a) Nodular infiltration of the parametrium on one or both sides, extending to the wall of the pelvis with limited motility of the uterus or to full fixation of the same.

(b) Superficial infiltration of the vagina with mobile uterus.

(c) Metastatic growths in the pelvic nodes with relatively small primary growth.

(d) Isolated metastatic growth in the lower part of the vagina.

Stage 4.

(a) Massive infiltration of the parametrium on all sides.

(b) Carcinoma involves the bladder or the rectum.

(c) The vagina is infiltrated.

(d) Remote metastatic growths are present.

The above major classifications are of considerable value in the selection of the method of choice in treating uterine malignancies. The agencies at hand for such treatment consist of surgery, electric cauter, radium and high voltage x-ray. Primarily, the subject belongs

to the field of surgery. In the consideration of the method of choice there must be the proper clinical consultation with the surgeon, the pathologist, the radium therapist, and the roentgenologist. Each case of uterine malignancy is an individual problem and should be treated as such regardless of the above classification and no hard and fast rules can be applied. The principle upon which successful cancer therapy is based is the complete eradication of the disease. Presence or absence of metastases plays an important part in this and may occur early or late. Metastases are not always demonstrable and, therefore, all treatment should be directed in such cases as though there were none, and, if they manifest themselves later, be treated accordingly.

Lord Moynihan recently summed up the value of radium and, of course, deep x-ray, in the following manner: "The surgeon's knife in the most highly trained hands is an instrument of great delicacy, but it cannot always discriminate between healthy tissues and diseased tissues. Radium is an instrument of far greater delicacy because its action is selective, that is to say, it acts differently upon the diseased and healthy tissues, killing the one and leaving the other. The difficulty of its application sometimes lies in obtaining access to the diseased parts when they are inside the body and in placing it in close relation to every particle of cancerous tissue where access has been obtained. Great advances have been made, and it is now true to say that certain mutilating operations have been virtually abolished, as, for instance, those concerned with the treatment of cancer in the mouth or on the tongue.

"Radium will gradually encroach more and more upon the field of surgery, but it can never entirely replace surgery, since it is not everywhere applicable. Where radium is applicable, its effect will always depend upon greater diagnosis of the disease so that greater success can only follow upon greater readiness of patients to present themselves for examination and upon the increasing skill of the medical profession in diagnosing the disease. It is a fair claim to make that the results up to the present are encouraging, but in the treatment of cancer we must always take the long view, and must seek to know what results are found, not in a few months' time, but at the end of not less than five years."

Adeno-carcinoma, which is probably the least malignant and which is usually confined to the fundus of the uterus, is best treated surgically by complete hysterectomy, followed by a radium pack in the vagina and by deep x-ray therapy. In those patients who are poor surgical risks or those who refuse operation, the insertion of radium tubes, containing in the aggregate 100 milligrams in tandem so as to cover the entire uterine mucosa for a period of 30 to 36 hours, is advisable. This can be repeated in eight or ten weeks by a dose of equal amount for twenty-four hours.

Epidermoid carcinoma of the cervix is probably best treated by radiation. Some workers have advocated post-radiation hysterectomy to be done in early and selected cases. Other workers have classified carcinoma of the cervix as operable, border-line, and inoperable, but have advocated radium in all. Moynihan's dictum should be followed in carcinoma of the cervix because of the difficulty of complete eradication by operation and because of the penetration and selectivity of radium.

The radium treatment of carcinoma of the cervix has been done generally in two ways: (1) smaller amount of radium over a longer period of time; or (2) a large amount of radium for a shorter period of time. This latter method consists of one heavy treatment at one sitting followed two or three months later by a second prophylactic treatment of lesser amount. The latter method is the method which I prefer as it requires less inconvenience and less expense to the patient. One should hit hard while the hitting is good.

The application of radium should consist of from 100 to 150 milligrams to be used for thirty to thirty-six hours, giving a total of 3,000 to 4,500 milligram hours (mgh.). The radium should be in 25 and 50 milligram tubes, screened with bronze and rubber. If possible, one tube should be inserted into the cervix beyond the inner os, another tube should be placed directly in the cervix, and the other tubes should be placed horizontally across the cervix in front. This gives good cross-firing through the entire area involved. The radium tubes should be held in place by gauze packs and occasionally sutures may be used. The packs should be placed plentifully against the bladder and the rectum. Laterally there is not so much need of screening. The gauze makes the best screen by reason of distance obtained to prevent the burning of the tissues. Each case is a separate problem and the arrangement of the tubes and gauze is made accordingly. The main thing is the close approximation of the radium to the malignant areas. It is at this point that the pathologic classification comes in and is of value in determining the success of the treatment. Some workers have used radium needles or implants of emanations but the tissues are hard to get at with needles. It is hard to properly place the needles and the tissues act too greatly as a screen for deep penetration. Furthermore, the cautery effect is too great. The most effective radiation is the gamma ray radiation and this is obtained from the radium in tubes.

All carcinomata of the uterus are not cured. Many of them are cured. The percentage of cures varies with the methods employed and also with the stage of the case at the time of the treatment. All cases should be thoroughly treated largely in the same manner, as some of the worst in appearance, both clinically and microscopically, are the most amenable to treatment and cure. Likewise, grade four carcinomata show much amelioration with the clearing up of foul discharges and the prolongation of life.

Associated with the use of radium in the treatment of uterine malignancy is the use of deep x-ray therapy. This has been discussed in a previous paper. I wish to emphasize the value as an additional means of cross-fire radiation. It should be used in most cases of uterine malignancy as an additional weapon to obtain a cure.

The measure of success of any method depends upon the end-results. The results of radiation therapy should be determined by the record of cures and the prolongation of life, the analysis of such records and statistics depending upon the type and the stage at which the treatment was started. Present statistics are accumulating rapidly which are showing the marked value of radiation therapy in uterine malignancy. The best results are obtained where careful consultations are held by the surgeon, the pathologist, and the radiologist.

DR. MARTIN NORDLAND: The benefits of radium have been frequently discussed but many of us have never thought about the dangers in the uses of radium. Dr. A. S. Fleming from the Hillcrest Hospital is well qualified to discuss this subject. We will now hear from Dr. Fleming.

DANGERS IN THE USE OF RADIUM

DR. A. S. FLEMING: Of the several methods used in the treatment of cancer today, surgery, x-ray and radium, I think it may be safely said that radium is as free from danger as any. There is little, if any, immediate mortality. There is less shock or intoxication and the success following its use in certain types of cancer leads to the hope that its field of usefulness may be extended as our knowledge and skill in its application increases.

Used as a palliative measure in the recognized hope-

less and inoperable cases, it brought about such surprising and gratifying results that today no case of cancer should be denied the opportunity of receiving treatment by this potent agent that has the slightest chance of survival in the light of our newer knowledge.

On no subject in connection with the treatment of cancer is there more misinformation abroad than with reference to radium. One error very generally met with concerns the effect or danger of light or insufficient treatment in bringing about stimulation of the growth and hastening metastasis. This idea is not only entertained by the layman but also very generally by the medical man. This notion is on a par with the fear of the surgeon's knife and the taking of sections for biopsy. The effect of Gamma radiation on the malignant cell is always one of inhibition, either temporary or complete destruction. It never stimulates.

The criticism that should lie against light or insufficient radiation is not that it stimulates the growth of malignant cells but that the one opportunity that the patient may have of cure may be lost by the temporary relief that may follow. There never will recur as good an opportunity for successful treatment of the growth as when it is first discovered. The first course of treatment should be to the limit of normal tissue tolerance. If that is done, says Dr. G. E. Pfahler of Philadelphia, many more of our patients will recover than if we try to give as little radium as possible.

On a par with the above misconception is the prevailing opinion that the application of radium is an extremely simple process and that anybody can do it. This is the cause, according to the observations of Dr. Ward of the Women's Hospital in New York, of a great deal of unnecessary suffering in the forms of various complications. He says that Dr. Regaud of Paris has stated very aptly "that it is necessary to have much experience to obtain from this method of treatment all of the good that it may give without the evil it may do."

Radium is a very potent substance. Anyone aspiring to give radium treatments should know as much as possible of its physics and chemistry, and of its biological effects, its limitations and its suitability to the particular case in hand. Every case of cancer is an individual problem and no one treating cancer should be so wedded to one line of treatment that it is applied indiscriminately. The use of surgery, radium and x-ray, one or all combined, may be needed to secure the best results.

There is one danger that I think should be called to your attention, and that is the advertisement of the Commercial Radium concerns telling how to cure cancer with the aid of their radium which they will supply with the advice of their expert in radium dosage and technic. This practice and insidious appeal, I think, should not meet with your approval. The treatment of cancer by remote control is not the best treatment.

DR. MARTIN NORDLAND: It is a question whether the discussion of malignancy of the skin should be included under the division of radium therapy. We will let the next speaker decide this question for you. I take great pleasure in introducing Dr. S. E. Sweitzer.

SKIN MALIGNANCY

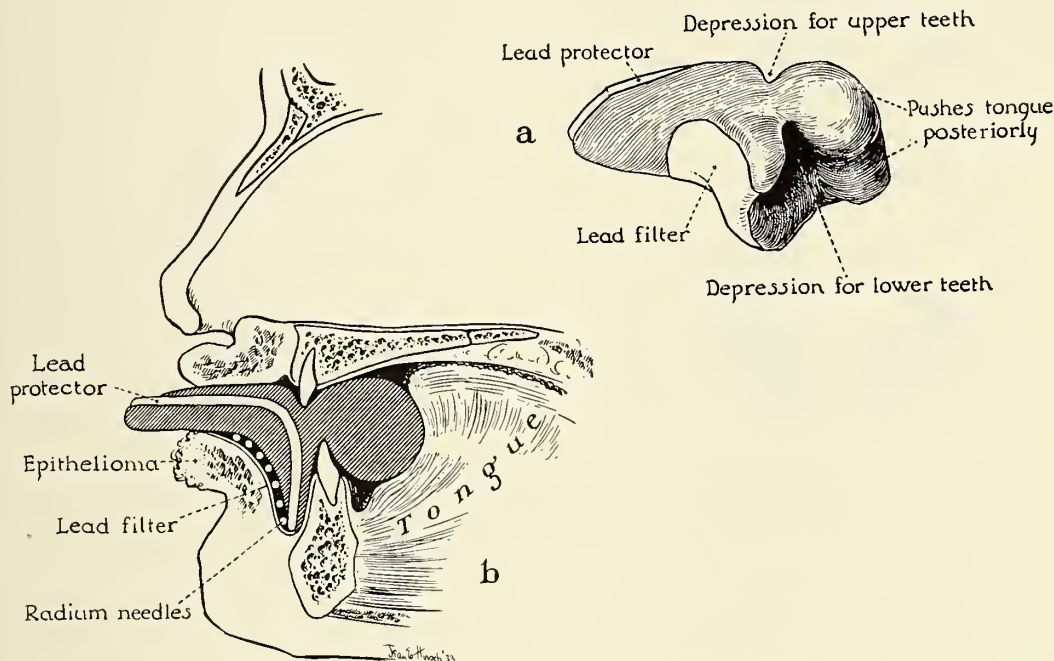
DR. S. E. SWEITZER: In the first place, I want to emphasize that you must make a diagnosis of the condition before you can treat it with anything. We cannot expect everyone to be a dermatologist, but we hope that if he does not know what the lesion is he will ask someone to help him out. That is only natural, you see. We find that quite frequently skin cancers are allowed to exist for months and sometimes years. They are slow-growing and physicians who should really know better will tell their patients that they should leave these lesions alone. Any lesion on the skin, par-

icularly the face, which begins with a small ulcer, should be looked on with suspicion and an effort made to determine the diagnosis.

In the treatment with various physical methods, x-ray and radium, I want to emphasize that the idea of the treatment is to destroy these cancer cells and that is done by giving a heavy dose. We have gradually in-

surface of lip treated. The area treated is approximately as great as the area excised in surgical removal of a cancer of the lip—approximately 1 cm. on all sides of the visible or palpable edge of the tumor. Kerr dental wax is used to make the mould. Lead filter 0.5 mm. thick is placed on the surface over the radium needles. A lead protector 1 mm. thick is em-

Radium Applicator for Epithelioma of Lip



creased our base limit of dosage higher and higher as we have had more experience because we have found that more and more of these cases, instead of being basal, were mixed and sometimes were squamous. It is not so easy to tell them apart.

(Numerous illustrations of skin cancers were shown.)

DR. MARTIN NORDLAND: The discussion of cancer of the oral cavity should rightly come at the beginning of this symposium. Dr. Wm. T. Peyton of the Cancer Institute of the University of Minnesota has kindly consented to discuss this subject. I feel he is particularly well qualified to speak on the scope of radium therapy with reference to this subject because of his large experience in this field.

TREATMENT OF CANCER OF THE LIP

DR. WM. T. PEYTON: The primary carcinoma of the lip can always be treated by radiation but a small well circumscribed lesion may be removed by excision. A u-shaped excision is preferable to the usual v-shaped excision. In advanced lesions, diffuse lesions spreading over a considerable part of the lip and recurrent lesions extensively infiltrating the lip, the deformity following adequate surgical removal is prohibitive and unnecessary. Primary lesions of the lip inadequately treated, with persistence or local recurrence of the lesion, are best treated by wide excision.

The technic of radium application for carcinoma of the lip is illustrated in Figure 1. Approximately 100 mg. hrs. is used for each square centimeter of inner

bedded in the wax to protect the roof of the mouth and upper lip. The tongue is pushed back by the wax to diminish the radiation of the tongue by keeping it at a distance from the needles. Since this application is applied to the inner surface of the lip only, the outer surface of the lip is treated by a full erythema dose of x-ray (100 S.E.C. or approximately 1,000 r).

Immediately after this treatment of the primary lesion prophylactic high voltage x-ray therapy is given to all of the cervical lymph nodes on both sides of the neck and six weeks later the lymph nodes are removed from the submental and submaxillary triangles of each side. It is apparently important but little emphasized in the treatment of cancer of the lip that the removal of the nodes be delayed for some time after the primary lesion has been completely removed or destroyed.

The upper deep cervical nodes are removed together with the submental and submaxillary nodes if any of these two groups of nodes contain demonstrable metastatic carcinoma.

A Crile block dissection on one side is done if any of the deep cervical nodes on that side are involved with metastatic carcinoma.

CANCER OF THE ORAL CAVITY

Cancer of the Tongue.—The primary lesion in cancer of the tongue is best treated by radiation and this is best done by a combination of interstitial radiation and high voltage x-ray therapy.

Interstitial radiation may be in the form of platinum needles containing radium or gold implants containing

radium emanation (radon). The latter are preferable because more easily inserted so as to give a proper distribution of radiation. Whichever form of radium is used it should be placed not in the lesion but under and around the periphery outside of the visible or palpable lesion, approximately in the same plane that

Treatment of Tumors of the Pharynx.—Squamous cell carcinoma of the pharynx are, as a rule, treated by interstitial radiation and deep x-ray therapy but some of the well localized lesions of lower grades of malignancy may be removed by a lateral pharyngotomy (Trotter operation).

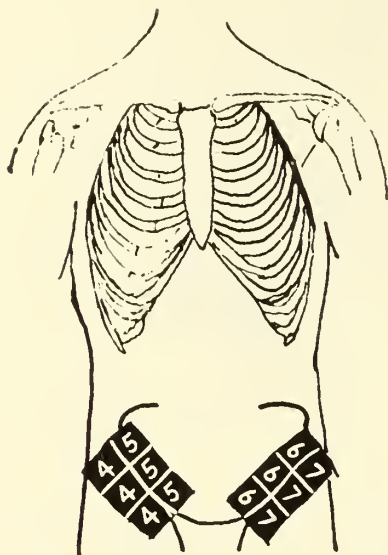


Fig. 1. Case of high rectal carcinoma illustrating application and dosage of radium both to groin and to lesion proper.

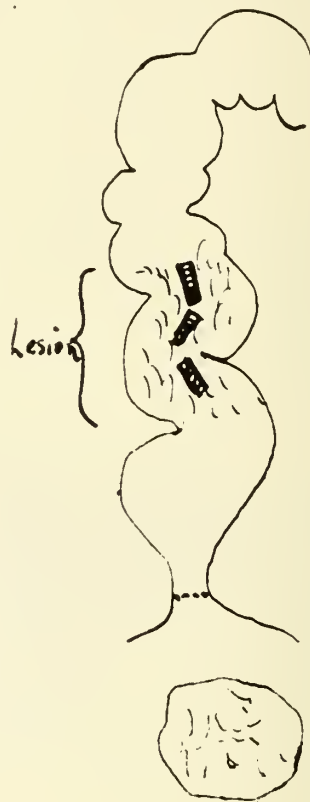
Groin (left)—12 areas, 50 mg. each, 14 hours.

Lesion (right)—High—50 mg., 14 hours, 700

Mid—50 mg., 14 hours, 700

Low—50 mg., 14 hours, 700

2100



one would cut in a conservative surgical excision of the lesion. In lesions posterior to the anterior third of the tongue, part or all of the radium should be inserted through the skin of the submental region and guided into the proper position by a finger in the mouth, palpating the posterior part of the tongue and floor of the mouth in this region.

To determine the dosage take the square of the diameter measured in centimeters and this gives approximately the number of millicuries of radon that should be used.

Prophylactic high voltage x-ray therapy is given to the cervical nodes on each side of the neck. The tongue is included in the fields. A Crile block dissection of the neck is done only if and when the cervical nodes become clinically involved with metastatic cancer, never until a few weeks after complete destruction of the primary lesion.

Carcinoma of the Mucous Membrane of the Oral Cavity Elsewhere Than That of the Tongue.—Interstitial radiation in dosage similar to that used in carcinoma of the tongue and distributed in much the same manner is the method of choice unless bone is involved, when, as a rule, surgical excision is the method of choice. This excision is carried out with surgical diathermy for the soft parts and a chisel to remove the involved bone. The external carotid artery on one side is frequently ligated to diminish bleeding during these excisions. The cervical lymph nodes are sometimes given prophylactic deep x-ray therapy but an invariable rule cannot be made for such prophylactic treatment in these lesions. Decision is made in each case according to the location and malignancy of the lesion.

Lympho-epitheliomas are treated by high voltage x-ray therapy in heavy dosage.

DR. MARTIN NORDLAND: The last subject to be discussed with relation to the use of radium therapy is Cancer of the Rectum. This subject is fittingly placed on the program and Dr. Lawrence M. Larson will discuss this phase of the problem.

RADIUM AS AN ADJUNCT TO SURGERY IN THE TREATMENT OF CANCER OF THE RECTUM

DR. LAWRENCE M. LARSON: It is quite generally conceded that the use of radium alone is not justified in the treatment of operable cancer of the rectum but that surgical extirpation remains the method of choice in the eradication of this type of lesion. However, there have been reported a number of cases in which early lesions have been cured by radiotherapeutic methods so that unanimous agreement as to the rôle of radium in the treatment of small rectal neoplasms has not been reached. On the other hand, no one can deny the marked palliation to be derived in the treatment of large inoperable growths, sometimes rendering them operable, but practically always resulting in shrinkage of the lesion, definite decrease in the amount of bleeding and foul discharge, and at least temporary improvement in the general condition of the patient. Between these two extremes are cases in which there is ques-

tion of operability due to extension, fixation, or size of the growth, or to poor general condition of the patient, and in these cases it is entirely possible, by adequate dosages of radium, to convert an inoperable lesion into an operable one, to render a deep lesion a surface one, and in many instances, to offer a much more

case. When there is extensive infection of the perirectal tissues radiotherapy is contra-indicated.

3. *Recurrences.*—In a general way, the same advantages obtain in the treatment of recurrences, although to a lesser degree, frequently because of their inaccessibility. Local or perineal recurrences and occasion-

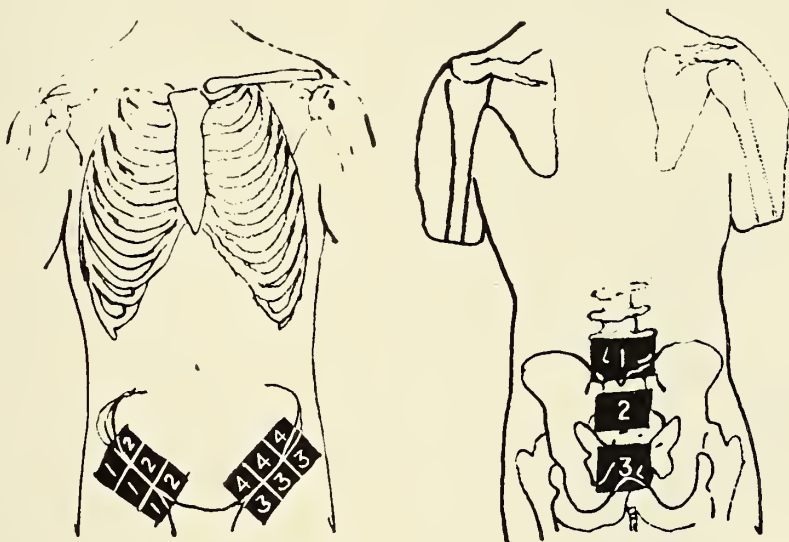


Fig. 2. Typical case of rather large carcinoma low in the rectum. Radiation of the groin as well as of the sacral and perineal areas.

Groin (left)—12 small blocks, 50 mg. each, 14 hours, 700.

Sacrum and perineum (right)—3 large blocks, 3 applications, each 200 mg., 20 hours. Lead 2 mm., wood 5 cm.

favorable prognosis for cure than if surgical means alone were employed. It is thus self-evident that success depends upon the closest coöperation between the surgeon, radiologist and patient.

When one considers that one-half to one-third of these patients, as they present themselves, are denied surgical treatment because of contraindications of either a local or general nature, and, further, that of those operated upon not over a third remain cured for five years, this means that radium can be used at sometime or other either on the original lesion, on metastases or on recurrences in about three-fourths of all cases.

There are three types of cases in which radium may be used to advantage.

1. *The operable lesion.*—In this type of case all possible benefits should be sought from both surgical and radiological methods. This may be accomplished even in small lesions by giving adequate doses of radium six to eight weeks pre-operatively, so that shrinkage of the growth takes place. In some instances of this character, no evidence whatever of neoplastic cells can be made out after resection of the rectum, the bowel being perfectly smooth with only a scar to indicate the previous location of the lesion. In patients whose general condition contraindicates immediate operation although the local lesion is operable, radium is of especial value. This is also true when the patient refuses operation or in conditions in which it is desired to avoid colostomy.

2. *Inoperable lesions.*—Radium may be used to advantage in many of these cases and in some it has been noted that the lesion actually becomes operable as a result of the treatment. In the others the patient's general condition is improved, and obstruction, bleeding, and pain are definitely lessened. There is no question as to the palliative benefits derived in this type of

ally those in regional glands, may be treated with radium alone or in conjunction with surgical means.

The question of whether colostomy should be done preliminary to radiotherapy hinges almost entirely upon the actual presence, or upon the imminence, of obstruction by the lesion. In cases of definite blockage, there is no question as to the advisability of drainage of the bowel and at times it is even an urgent measure. At other times when the lesion gives evidence of impending obstruction such as produced by an annular growth located at the rectosigmoid juncture, or one involving the anal canal, it is a question of judgment whether colostomy is to be done. This must be decided upon the merits of the individual case. It is true that greater accessibility to the lesion may be obtained through the distal stoma of the colostomy, as brought out by some authors, yet the procedure should seldom be done for this reason alone. When extensive infection of the perirectal tissues is present preliminary colostomy is of aid in reducing this, so that it may be possible to use radium later.

Before beginning treatment of rectal neoplasms with radium, several factors must be ascertained. First of all, an exact diagnosis of the lesion must be made, usually by biopsy, not only as to the actual presence of malignancy but also as to the type and grade of neoplasm with which one is dealing. It is well known that the columnar cell or adenocarcinomatous type of growth is more radioresistant than the squamous cell or epitheliomatous variety. Both of these types of growths occur in the rectum, the former originating as a rule above the anorectal juncture and the latter below. The grading of the lesion is highly desirable since tumors of high degree of malignancy (grades 3 and 4) respond most rapidly to radiotherapy and offer the poorest results from surgical therapy, while

the opposite holds true for tumors of low grade (1 and 2). Most neoplasms of the rectum fall in the latter group, in contradistinction to carcinoma of the cervix, in which the preponderance of cases is of high degree of malignancy. Another factor of importance is an

mal tissues. Since carcinoma of the rectum, as a rule, is relatively benign except in young individuals, this margin of safety is small and accidents may easily occur. It is also true that definite rules for treatment are impossible to lay down, but that the greatest flexi-

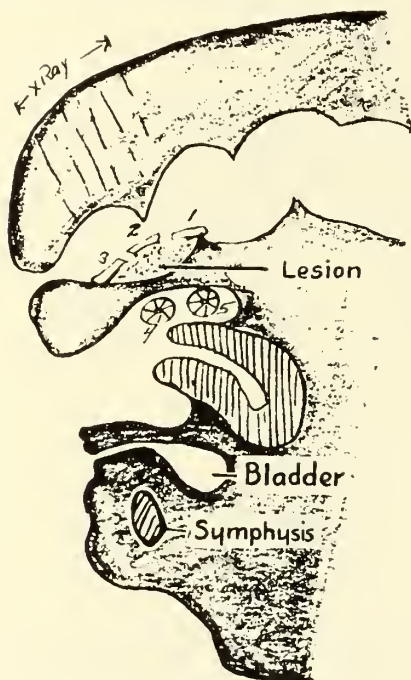


Fig. 3. Carcinoma of the anterior wall of the rectum illustrating method of application of radium both vaginally and directly to the lesion.

Nos. 1, 2 and 3—700 to 300 mg. hours each (70 mg. per sq. cm.—maximum).

Nos. 4 and 5—700 each.

Needling if convenient (1 mg., 48 hours; 1 cm. apart).

Surface packs to inguinal nodes if involved low; not necessary if lesion is as high as rectosigmoid.

appraisal of the general condition of the patient. If this is not satisfactory it should, if possible, be brought to the point where any complications which may arise, such as severe infection, hemorrhage, deleterious systemic effects, and so forth, may be withstood with a reasonable degree of safety.

The purpose of radium in the treatment of malignancy is to destroy or eradicate the lesion, yet maintain preservation of normal tissue. This is the same purpose attained by surgical methods, and to account for cures by this method one must assume that cancer begins as a local process, an assumption which is an entirely logical one. One must also take into consideration bodily defensive mechanisms, especially the character of the stroma making up the tumor, which may vary in its quality and quantity and thus account for different reactions of similar tumors to the same doses of radium. This difference in stroma may explain the fact that rectal neoplasms, although histologically similar, are generally more radioresistant than lesions of similar structure located in other parts of the body.

In the radiotherapy of rectal neoplasms there are several factors which operate to render treatment difficult and possibly less satisfactory than with lesions elsewhere. These are: (1) a difficulty in approach or accessibility to either the lesion or the regional lymphatics; (2) the frequent radio-resistance of the tumor; and (3) the radio-sensitiveness of the bowel mucosa. The problem is to get a maximum dosage of radium to the treatment field with the least injury to the nor-

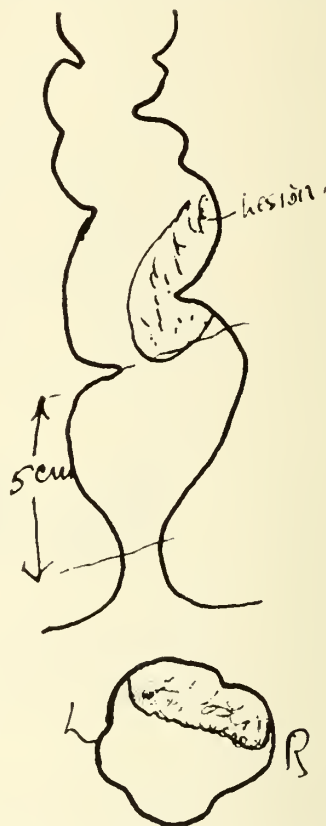


Fig. 4—Lesion of the rectosigmoid area. Radium applied both through vaginal route and by means of needles placed interstitially.

Radium pack—(a) Vaginal transverse—700 against rectum
(b) Vaginal right —700
(c) Vaginal left —700

Lesion—17 needles, 1 cm. apart, 48 hours (1 mg. each).

bility must be observed since individual cases each present their own problem.

Two methods are generally used in attacking most cases of cancer of the rectum or rectosigmoid—surface radiation and interstitial radiation. To protect normal tissues with either method it is first of all of the greatest importance to pack away, if possible, the opposite wall of the rectum by means of gauze. Since distance is the best protection from radium rays, because the dosage of radiation has been found to be inversely proportional to the square of the distance, one can appreciate the importance of adequate packing. These needles contain usually 1 milligram of radium and are filtered by 0.5 millimeters of platinum. They are placed in the growth 1 centimeter apart and left for 48 hours. The average growth takes from 15 to 20 of these needles, so that 800 to 1,000 milligram hours are utilized in this manner. The position of these needles, 1 centimeter apart, is calculated to destroy the neoplastic tissue in this area but it is a well known fact that malignant growths do not grow in definitely regulated paths, consequently this type of treatment must be supplemented by surface radiation, a method by which the radiation is intended to reach all parts of the tumor.

The latter is done by packing the opposite wall as far away as possible. A radium pack is applied to the lesion, the dosage being so calculated that for every square centimeter of surface of the growth there will be 50 to 70 milligram hours of radium given. This

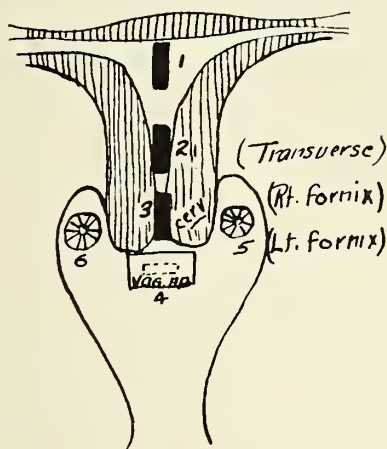


Fig. 5. Carcinoma of the cervix. The same method is used for the large cauliflower growths as for the ulcer types. Only in exceptional cases in which the growth does not melt with this treatment are needles inserted into the growth.

- No. 1—1400 1 application
- No. 2—1400 2 applications
- No. 3—1400 2 applications
- No. 4—700 1 application (vag. type)
- No. 5—700 1 application (vag. type)
- No. 6—700 1 application (vag. type)

Average—6300 mg. hours, divided into 8 applications, giving usually two a week.

The patient is in the hospital over night only. In making applications in positions 5, 6 and 4, care must be taken to pack the bladder and rectum as far away as possible, using regular gauze packing. Thus, distance is the important factor in getting no involvement of these two organs.

is usually accomplished by means of applicators, each containing 50 milligrams, which are kept in place twelve to fourteen hours. A little reaction on the part of the normal tissues is to be expected but this should never be severe. In low lying lesions, especially those of the anorectal area, it is important to irradiate the inguinal glands on each side and the surrounding lymphatics. This procedure is not necessary for neoplasms high in the rectum or in the rectosigmoid. It is accomplished by the use of six 50 milligram applicators, each covering a square inch of skin surface and left in place about 14 hours. The procedure is repeated on the opposite side, thus giving $6 \times 50 \times 14 \times 2 = 8400$ milligram hours. When it is impossible to completely remove the lesion, such as after posterior resection of the rectum, it is advisable to use radiotherapy immediately postoperative. This may be done by applying packs of radium directly in or over the wound. This consists of three or four 200 milligram applicators or packs placed at a distance of two inches from each other as shown in the diagram.

In summary, it should be repeated that at present it is not justifiable to treat operable neoplasms of the rectum by radium alone since surgical methods offer better results. The treatment with radium has its greatest value when used in conjunction with surgical methods, and in carrying this out it should be emphasized that the closest coöperation should be maintained between the surgeon, radiologist and patient. Radiologic methods are not competing with surgical procedures but are of distinct aid in the palliation and cure of malignant lesions of the rectum.

Respectfully submitted,
F. A. OLSON, M.D.,
Secretary-Treasurer.

OBITUARY

Frederick Eugene Vrooman

Frederick Eugene Vrooman, St. Francis, Minnesota; University of Louisville, Louisville, Kentucky, 1902; aged sixty-one; died, June 25, 1934, of cerebral hemorrhage.

Carl J. Holman

1869-1934

Dr. Carl J. Holman, one of the founders of the Mankato Clinic, died at the home of his sister, Mrs. Josephine Belisle, in Minneapolis, May 30, 1934, after an illness of several months. He had recently been a patient at St. Vincent's hospital in Los Angeles, where he underwent a major operation.

Dr. Holman was born October 25, 1869, in Freeborn county. He was the son of Iver J. Holman, who passed away in his ninety-second year two weeks ago, a few hours before Dr. Holman reached Minneapolis from Los Angeles, where he had been practicing for the past five years.

Dr. Holman was a graduate of Rush Medical college and of the Chicago university. He was affiliated with the national, state and county medical societies, and was also an honorary member of the Blue Earth County Society. He held a fellowship in the American College of Surgeons. He was a member of the Minnesota Alumni Association of Alpha Kappa Kappa.

Dr. Holman practiced in Mankato for thirty years. He was a member of the First Presbyterian church in Mankato, and at the time of his death of the Third Presbyterian church of Los Angeles. For a number of years he served on the Minnesota State Board of Medical Examiners under both Governor Burnquist and Governor Eberhart.

Dr. Holman's interest was never far from Minnesota and Mankato in particular. He kept in close touch with Mankato civic affairs not only during his residence there and in this state, but also during the five years of his stay in California.

Surviving are his wife, Dr. Madge T. Holman; one brother, Knute A. Holman of Minneapolis; one sister, Mrs. Josephine Belisle of Minneapolis; four nephews and two nieces.

Mathias Hubert Cremer

1870-1934

Dr. M. H. Cremer, prominent physician and surgeon, chief of the surgical staff of St. John's hospital, Red Wing, died suddenly at his home Saturday afternoon, June 2, 1934, from heart trouble, from which he had been a sufferer for the past year or more. He had made calls and been at his office until noon Saturday, although complaining of heart pains. While at home he was seized with a severe attack while writing a letter, and succumbed at his desk.

Dr. Cremer was one of Red Wing's most prominent citizens and was well known in medical circles. His fame as surgeon was particularly spread through the northwest, from which patients came to St. John's hospital in large numbers. During the past year or two, ill health narrowed his field of activity but he still headed the surgical staff at St. John's hospital and took active part in the practice of the Medical Block Clinic.

Born at Cashion, Monroe county, Wis., March 12, 1870, he received his early education in the schools of Cashton and La Crosse. He graduated from the medical college of Louisville University, Kentucky, in 1891, returning to Monroe county to practice at Cale-

donia, for nine months. He then entered Rush college, Chicago, to graduate in 1893. For nine years he practiced at Mazeppa, Minn., in partnership with Dr. L. E. Claydon, who is still a member of the firm. In 1901 both came to Red Wing to establish the clinic, which grew to number six doctors and surgeons.

Dr. Cremer was a member of the American Medical City, October 22, 1896, who with the following children, survive: Mrs. L. D. Elliott, Minneapolis; Mrs. F. J. Putzier, Ellsworth; Mrs. I. E. Magee, Ellsworth, and Frances Cremer, Red Wing.

Dr. Cremer was a member of the American Medical Association, the Minnesota State Medical Association, the Southern Minnesota Medical Association and the Goodhue County Medical Society. He was a Mason, an Elk and member of various fraternal bodies. He was surgeon for the C. M. & St. P. and Chicago Great Western railroads. He was one of the founders of St. John's hospital, which he served as head surgeon.

He was an ardent lover of sports and gave enthusiastic and financial support to baseball, basketball, football, bowling, etc. During the days of the old "Mimny baseball league" he was president of the Red Wing club. He backed many a Red Wing team in baseball. He was one of the prime movers in securing the construction of the Recreation Alley bowling building here and for many years bowled regularly with one of the leagues.

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

Books Received for Review

- MANUAL OF THE DISEASES OF THE EYE. Charles H. May, M.D. Director and Attending Surgeon, Eye Service, Bellevue Hospital, New York, etc. 496 pages. Illus. Price, cloth, \$4.00. Baltimore, Md.: William Wood & Co., 1934.
- THAT HEART OF YOURS. S. Calvin Smith, M.D., Sc.D. 212 pages. Illus. Price, cloth, \$2.00. Philadelphia: J. B. Lippincott Co., 1934.
- THE CARE AND FEEDING OF CHILDREN. L. Emmett Holt, Jr., M.D., Associate Pediatrician to the Johns Hopkins Hospital, Baltimore, Maryland. Fifteenth Revised Edition. 259 pages. Illus. Price, cloth, \$1.25. New York: D. Appleton-Century Co., 1934.
- A TEXTBOOK OF BACTERIOLOGY. Hans Zinsser, M.D., Professor of Bacteriology and Immunology, Harvard University Medical School, etc., and Stanhope Bayne-Jones, M.D., Professor of Bacteriology, Yale University Medical School, etc. Seventh Edition. 1,226 pages. Ills. Price, cloth, \$8.00. New York: D. Appleton-Century Co., 1934.
- POSTURES AND PRACTICES DURING LABOR AMONG PRIMITIVE PEOPLES. Julius Jarcho, M.D., F.A.C.S., of New York. 175 pages. Illus. Price, cloth, \$3.50. New York: Paul B. Hoeber, Inc., 1934.

ALPHA-DINITROPHENOL—A METABOLIC STIMULANT

A year has elapsed since alpha-dinitrophenol was introduced into therapeutics as a metabolic stimulant by Tainter and his collaborators of the Stanford University. Considering the potency of the drug, few untoward results or accidents have been reported. The only definite side-action from the therapeutic use of the drug is a skin rash, which occurs in about one out of every fifteen cases. The rash is uncomfortable for a few days and then disappears without sequelae. There have been no deleterious effects observed so far on the kidneys, but rather the contrary. Likewise the liver appears not to be damaged. The introduction of dinitrophenol into therapeutics has aroused widespread interest in metabolic stimulants in general, and in substitutes for this drug, in particular. Already certain British workers are proceeding to test the therapeutic actions of a related cresol. No information is at hand on the frequency of undesirable effects from this cresol, nor is its clinical toxicity or efficiency established. Therefore the dinitrocresol is still in the experimental stage and not ready for general therapeutic use. In contrast, the past year's experience with dinitrophenol has shown it apparently to be a relatively safe and reliable metabolic stimulant with which the practitioner may obtain therapeutic results. This does not mean that dinitrophenol should be given to every obese patient. In those cases in which diet has failed and thyroid is either not needed or not tolerated, dinitrophenol may be used with good prospects of benefit. However, this agent must be used only under carefully controlled conditions and with due regard for the possibility that more extensive use may bring to light as yet unsuspected toxic effect. (*Jour. A. M. A.*, February 17, 1934, p. 542.)

VINYL ETHER

The Council on Pharmacy and Chemistry reports that vinyl ether (divinyl ether, divinyl oxide) is a preparation of Merck & Company, Inc., originally proposed by Leake and Chen for use in inhalation anesthesia in place of ethyl ether. Vinyl ether, as prepared for anesthesia, is said to contain 0.01 per cent phenylalphanaphthylamine to prevent polymerization and decomposition, and 3.5 per cent absolute ethyl alcohol to prevent freezing on evaporation. This product is not yet marketed for general use and is prepared at present only for investigative work. The advantages claimed for vinyl ether over ethyl ether are that it is less irritating to mucous membrane; that induction of anesthesia is much more rapid and recovery more prompt; that it has a somewhat higher partition coefficient than ethyl ether; that the minimum anesthetic concentration is much lower; that the minimum blood concentration of vinyl ether necessary for anesthesia is about one-fourth that of ethyl ether; that vinyl ether offers a greater margin of safety. In the clinical trials induction was said to be exceedingly rapid and recovery correspondingly prompt, the latter occurring frequently in from thirty seconds to one minute. Satisfactory surgical relaxation is stated to obtain and anesthesia has been maintained for varying periods up to nearly three hours. The Council decided to defer further consideration of additional evidence as to the therapeutic usefulness of this product and until the manufacturer markets vinyl ether for general use; at that time the preparation will also be examined by the A. M. A. Chemical Laboratory. (*Jour. A. M. A.*, January 6, 1934, p. 44.)

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PROGRESS IN 1934*

F. J. SAVAGE, M.D.

Saint Paul

LAST fall I was hunting back of Beaver Bay with a group of Duluth men, and on the opening day two of us together shot a buck. I said to my partner, "Art, I think this is your deer." His answer was, "This is *our* deer. That's the way I like to hunt." This little story illustrates my feeling about our progress in 1934. It is the result, not of the efforts of any one individual, but what we as a group have done.

Since January 1, I have been to Albert Lea, Grand Rapids, Aitkin, St. Cloud, Fergus Falls, Granite Falls, Wabasha, Fairmont, Stillwater, New Ulm, Olivia, Morris and Lake City. Almost everywhere the same spirit of good fellowship and coöperation has been apparent.

This same spirit of hearty coöperation has uniformly been shown by Dr. Meyerding and his entire staff. All of my requests have been met by prompt and efficient action. Dr. Meyerding's experience during the past years has been no small factor in the success of this meeting.

Our relations with the University have been most cordial. When I was at a luncheon with some of the medical faculty in honor of Dr. Biering, he commented on the most unusual situation being apparently on friendly terms with the faculty of the medical school. For some years Dr. O'Brien has assisted the Committee on Scientific Assembly in formulating their programs. The University at our request conducted a two-day post-graduate course. That our members appreciated this course was shown by a record-breaking registration of 128, more than three times that of any previous course. We are promised another short course this fall. The University Press has published the list of sub-

jects drawn up by our Committee on Hospitals and Medical Education as a joint project of our Association and the University Extension Division, which the Extension Division is administering.

The State Board of Health has conferred with us on many occasions as to matters of policy, and I have been invited to many of their meetings. This year they are holding one of their regular meetings in Duluth at the time of our annual meeting, and they contemplate making this coördination an annual custom.

All these facts cited show closer coöperation with our society.

When we consider the progress we have made along scientific lines, we are struck first by the keen interest aroused in cancer. The Rector report has been a tremendous stimulus to this interest. This disease as a cause of death in our State has jumped from sixth place in 1900 to second place in 1930. Many county societies have conducted cancer meetings, Dr. O'Brien has given radio talks on the same subject, and through Dr. Meyerding's efforts 500 newspapers throughout the State have printed authorized medical news stories, including those on cancer.

Some of you know of Dr. Wilder's scheme to disseminate accurate simplified information on the treatment of diabetes by the publication of a pamphlet for the use of both physician and patient. I believe that the principle back of this idea is sound, but the information intended for the patient should be supplied through his physician. Diabetes now holds tenth place as a cause of death in Minnesota.

The Heart Committee of the Association is regularly publishing articles in MINNESOTA MEDICINE.

*President's Address presented at the annual banquet of the Minnesota State Medical Association, Duluth, July 17, 1934.

MINNESOTA MEDICINE, through its new Economics Department, endeavors to keep us informed of what vitally concerns our pocket-books. Our Association has been criticised for devoting such a large percentage of its energies to economic affairs. My answer to such criticism is that those who offer it have been asleep for the past twenty years and need to wake up.

Many committee chairmen and members have generously given their time, their thought and their energy for the common good of our Association. A striking example is the way the St. Louis County Medical Society has worked for this 81st Annual Meeting. I congratulate this Society on their winning of the President's Cup. It should be considered a token of esteem and respect, and not from the President only. Because of the activities this cup acknowledges, public opinion in St. Louis County will also hold this group in high esteem. This sort of activity is helping to restore the position the family doctor once held in the public eye.

We feel, and I believe the State Board of Examiners feel, that they are a part of our organization. Their record of seventy-nine court convictions since the Basic Science law was passed presents a striking contrast to the record of the Board prior to 1927. Our Legislative Committee worked hard to secure the passage by the Legislature of the law under which the Board works. Mr. Brist speaks in the highest terms of the spirit of coöperation he has received in his work of law enforcement not only from our Attorney General but from the various county attorneys throughout the state. Our organization and the Board are fortunate in having the services of an attorney who is fearless and alert and who knows the law. One of the most outstanding events of the year has been the court decision handed down in Ramsey County that a corporation cannot practice medicine. This case was handled by the Attorney General's office in coöperation with the State Board of Medical Examiners. If this decision had been the reverse, every community in the State would have been menaced by a corporation run by laymen for their own profit, and giving medical and dental services for \$1.50 per month.

The chairman of our Legislative Committee reminds me of the motto of the Pinkerton Detective Bureau, "We never Sleep." Whether the Legislature is in session or not, he is always

keen and alert for the welfare of his fellows.

A committee, new this year, to study the matter of medical care in isolated communities met in Grand Rapids in February. The personnel of this committee included a representative group from the northern zone of the State. The conclusion reached was that, because of the automobile and good roads, there is no marked absence of medical care in this area. One man pointed out the obvious fact that thirty miles today is no greater than five miles thirty years ago. We should not, however, lose sight of the fact that in Saskatchewan, across the Canadian line, there are thirty-five communities served by tax-supported physicians.

The picture presented in the care of the indigent has been kaleidesopic. Our Organization has had many meetings with the Board of Control and State officials representing the Federal Relief Administration. One month there are 1,100 nurses working throughout the state, and shortly afterward, when the money is gone, there are fifty. One month there is money to pay physicians a fee reduced 40 per cent for the care of relief cases and the next month talk of tax-supported physicians. The Board of Control does not know, except from month to month, how much relief money is available. This is a serious handicap to them for any coördinated and continuous program. I believe the fee schedule finally adopted was reasonably fair. The Board has questioned some physicians' bills; so, in conference with our Association, a plan has been instituted of referring questionable bills to some physician in the locality in which the service was rendered, with the councilor of that district acting as intermediary. The Board has had a good deal of pressure brought on it to use chiropractors, osteopaths and optometrists in relief work rather than physicians. I have yet to hear of any of these practitioners supplanting physicians. By action of the Council, a telegram was sent to Washington pledging support to the President's program of relief as an emergency measure, but expressing the hope that, in matters of medical relief, existing agencies would be used instead of new agencies set up. We have advocated this same principle to the Board of Control.

We are proud of our Woman's Auxiliary. We look on them as a powerful factor in Public Health Education and as a great reserve force to

be called into service on command in our fight for economic independence.

Finally we approach a problem which in my opinion is one of the greatest which confronts organized medicine: that of the over-production of physicians, not only in Minnesota, but throughout the country. The Committee to Study the Limitation of Physicians to be Licensed in Minnesota has presented a very fine fact-finding report; but I think that their recommendations are inadequate. It would put an unfair burden on our State Board of Examiners to force them to select a limited number of applicants for license when all of the candidates have successfully passed their examinations. It is also obviously unfair to allow a candidate for the degree of M.D. to spend five of his best years in the study of medicine, which does not qualify him for any other line of work, and then drop him.

It is my belief that the solution of the problem must be by two methods: (1) by a weeding-out process to begin in the Pre-Medical Course

through a system of rating by a committee of the medical faculty, a plan already advocated by Dr. Bierring; (2) by a limitation, also based on a rating system, of those who are allowed to matriculate. From statistical studies already made this number is definitely established; there is no guesswork about it. Your Committee makes the suggestion that what Minnesota may or may not do does not affect the general situation in the United States. In my opinion this is not true. I am given to understand that in the House of Delegates of the American Medical Association Minnesota occupies a position of leadership. What we as a State may do along this line is likely to have a profound effect over the country. If the present generation of physicians is to avoid the finger of scorn being pointed at them by their successors thirty years hence, we must take action. What is more, we cannot expect the Medical School to take the initiative. The responsibility is squarely on the shoulders of the Minnesota State Medical Association. We have reached the stage where action, and not further statistical studies, is indicated.

DIABETES IN MINNESOTA*

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DIABETES has come to assume a position of major importance as a public health problem. Fifty years ago, deaths from this disease were infrequent. The mortality then was only 2.8 per 100,000. Even at the turn of the century the disease was twenty-seventh in rank among the causes of death. It is now in the ninth or tenth position, and if deaths from accident and congenital conditions are excluded, it occupies seventh place. The ratio of diabetic deaths to total deaths was 0.14 in 1880; it is now 1.84, having increased thirteen fold.

The Census Bureau was alert to the importance of the problem as early as 1906, and in 1909, in the volume "Mortality Statistics," the following

statement appeared: "Of comparatively trifling importance as a cause of death, diabetes shows a slowly progressive tendency to increased mortality, perhaps dependent as with cancer upon the advancing age distribution of the population." The discovery of insulin in 1921 led to the expectation that some decline in diabetic mortality would follow, and in 1923 and 1924 there was a decline from 18.4 to 16.5 per 100,000. Then the rate increased again, and a steady advance has followed, reaching 22 per 100,000 in 1932 (Fig. 1). These data are for the nation. Those for Minnesota will follow.

The United States has a greater death rate from diabetes than any other country of the world (Fig. 2)). The Netherlands come next with a rate of 17.7. Japan is at the foot of the list with only 3.5 per 100,000. These figures

*Read as a part of the report of the Committee on Diabetes of the Minnesota State Medical Association, Duluth, July 16, 1934.

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are from a recent article by Joslin, Dublin and Marks. It should be noted that Canada has a rate of only 12.8, and that in the United States itself the rate is quite inconsistent, being highest

more northern latitudes, but despite this irregularity the general increase in rate is world-wide; few countries or localities have escaped it.⁵ There is little agreement as to the reasons for

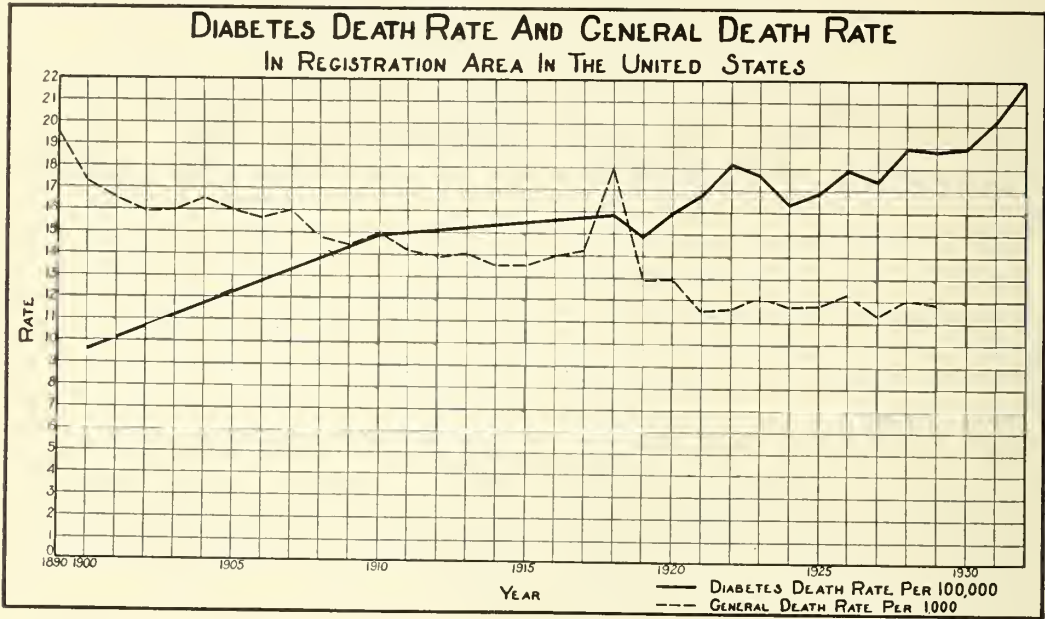


Fig. 1.

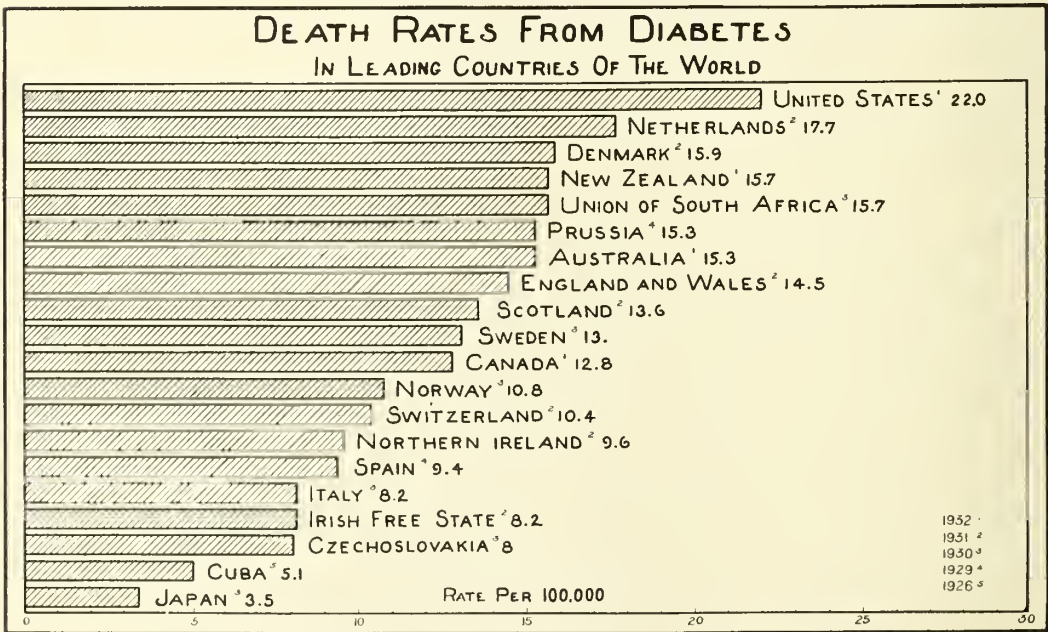


Fig. 2.

in Massachusetts, New York, Illinois, Kansas and Nebraska and lowest in the southern tier of states (Fig. 3). In Southern Europe, as in our Southern States, the rates are lower than in the

this increasing importance of diabetes as a cause of death. It is not to be explained by greater accuracy of diagnosis. Cabot found that diabetes was correctly diagnosed in 95 per cent of cases

coming to necropsy, and his observation was made in 1912. The simple test of the urine on which the diagnosis is based has not materially changed in the last thirty or forty years.⁹ Nor

work by Pincus and White does much to establish as a fact. If we are to decrease the incidence of diabetes, we must concentrate on families in which the disease has already appeared. Obesity

DIABETES DEATH RATE FOR UNITED STATES IN 1929

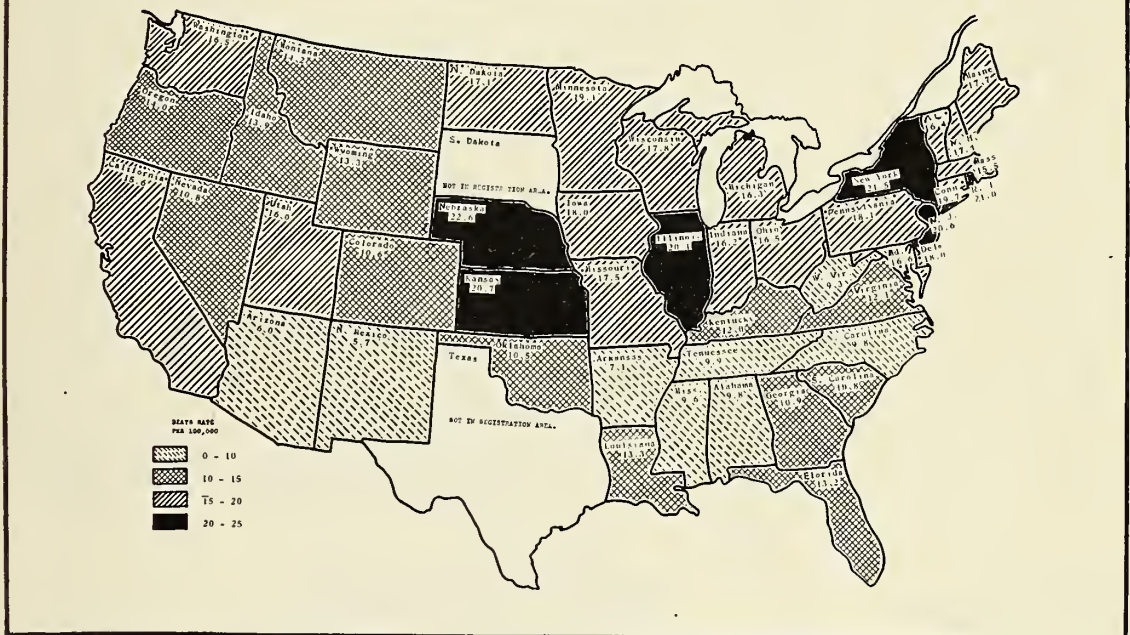


Fig. 3.

does the increase of the duration of life of the general population account for it entirely, since the rate of increase in diabetic deaths is many times the rate of increase in the average survival age of the population and, also, the death rate from diabetes is advancing much more rapidly than is that for other diseases of the aged, such as cancer.

A recent survey made by the Metropolitan Life Insurance Company¹¹ and the study of Joslin, Dublin and Marks reveal a factor of puzzling significance, namely, that the increase in mortality from diabetes is not uniform when analyzed from the standpoint of sex, age and race. The death rate among older women is advancing rapidly and overbalances, and thus obscures, a definite though small decline in the death rate among the young. This is true in England and on the Continent as well as in the United States.

The relatively high mortality rate among the Jews is attributed in large part to intermarriage of persons from diabetic families. That diabetes is inherited is an old hypothesis which recent

should be discouraged among members of such families; eating sugared foods should be restricted; and intermarriage among families similarly affected must be opposed.

The Situation in Minnesota

Parallel to the death rate from diabetes in the United States registration area as a whole is the death rate from diabetes in Minnesota. In 1929 Minnesota was seventeenth on the list of states reporting on this disease.

The number of diabetic deaths in the State, in 1915, was 366; in 1932, the number was 579. This represents an increase in the death rate from 16.40 to 22.37 per 100,000 of population. In the five-year interval which preceded the introduction of insulin, the average death rate was 15.8; in a recent five-year period it was 20.8. This is an increase of 32 per cent in the face of what Joslin and his coworkers call "the amazing progress that has been made in the treatment of the disease."

Diabetes is now in tenth place among causes

of death in Minnesota, being responsible for 2.5 per cent of all deaths. It challenges tuberculosis. The rate for tuberculosis, in 1915, was 102; this

A chart of the total deaths from diabetes plotted against the total deaths from carcinoma, the total deaths from all causes, and the total

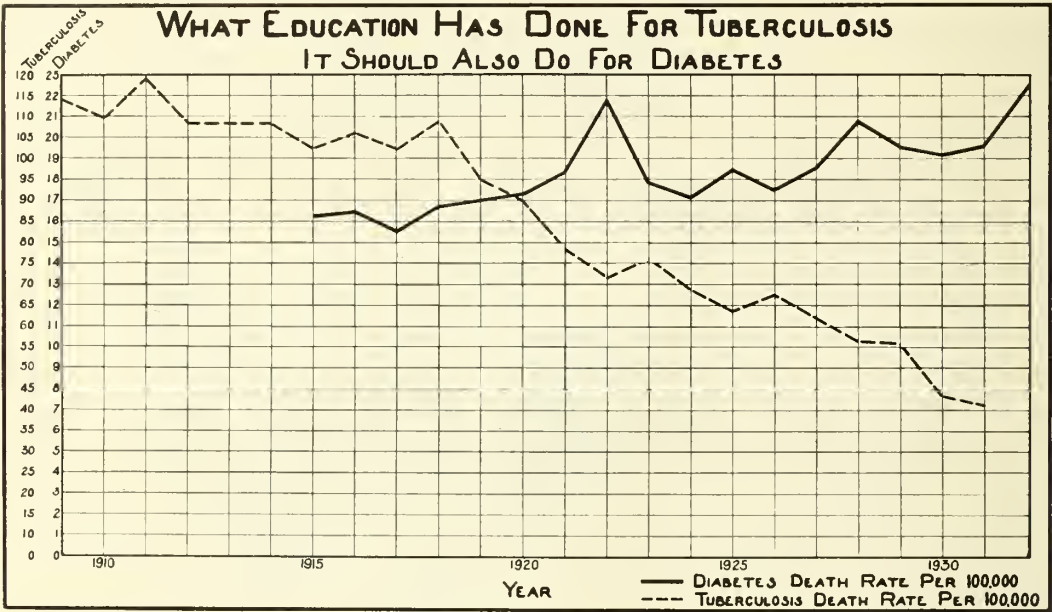


Fig. 4.

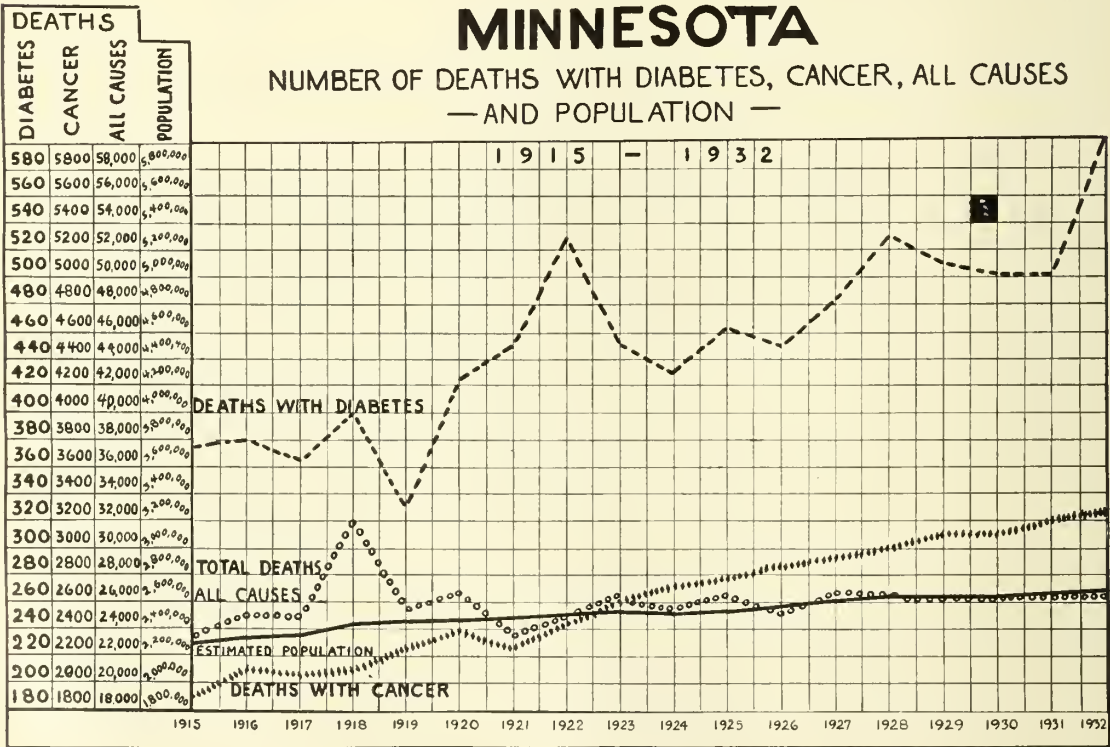


Fig. 5.

had fallen, however, to 41 in 1931, whereas the figure for diabetes had risen from 16.4 to 22.4 (Fig. 4).

population in Minnesota, is instructive (Fig. 5). The lines for population and total deaths follow each other very closely; both rise gradually. The

line for deaths from carcinoma rises smoothly but more rapidly than these two, whereas that for diabetes rises most rapidly of all. If we at-

received, and the following information is based on this survey. The distribution of the deaths by counties is shown in Figure 6.

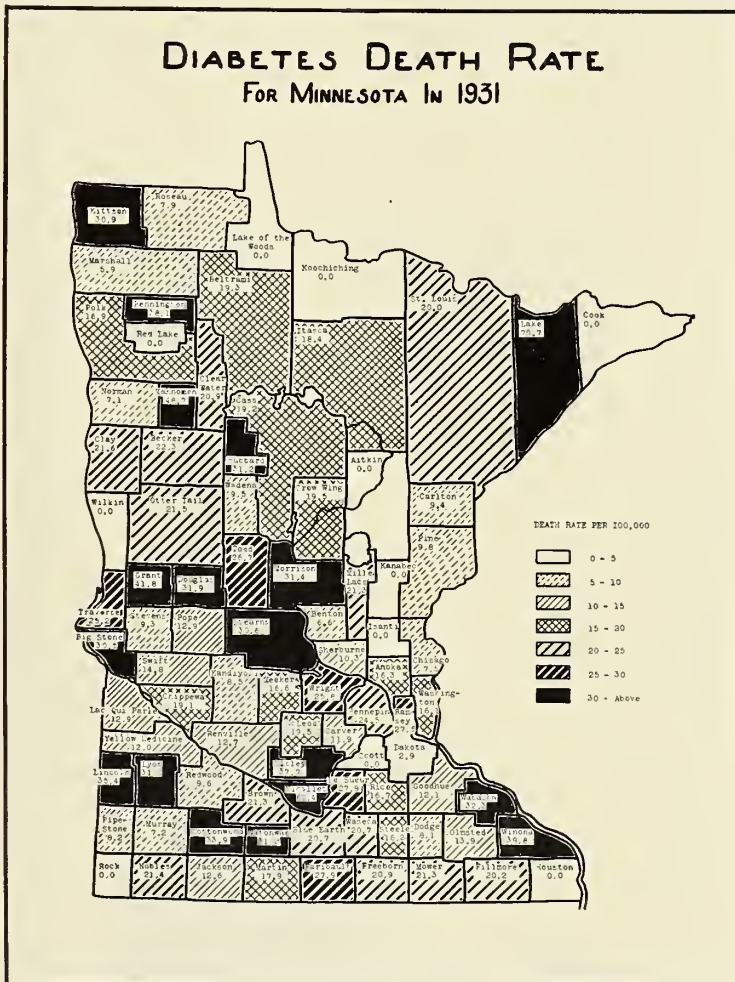


Fig. 6.

tribute the increase in cancer to the increasing number of people living into the so-called cancer age, then only a part of the increase in diabetes can be explained by the population, and the difference between the rate of increase for diabetes and that for cancer represents some factor other than age which is provoking deaths from diabetes. If this continues to operate for only a few years, diabetes will outweigh cancer as a public health problem.

In 1931, the diagnosis of diabetes was made on 547 death certificates, and with the assistance of the State Board of Health, letters were sent to the physicians who signed these certificates enclosing a questionnaire designed to determine the part played by this disease in the cause of death. Three hundred seventy-five replies were

TABLE I. AGE AND SEX DISTRIBUTION OF 547 PERSONS WHO DIED: DIABETES WAS REPORTED AS THE CAUSE OR AS A CONTRIBUTORY CAUSE (MINNESOTA, 1931)

Age, years	Males	Females	Total	Per cent of 547*
0-9	5	4	9	2
10-19	12	11	23	4
20-29	5	7	12	2
30-39	9	4	13	2
40-49	20	21	41	7
50-59	31	46	78	14
60-69	69	93	162	30
70-79	62	94	156	29
80-89	21	31	52	10
90-99		1	1	
Total	235	312	547	100

*Nearest whole number.

Of the 547 persons who died with diabetes in 1931, 235 were males and 312 females (Table I). There was an almost equal incidence of males

deaths below the age of forty to be only 14.4 in 1930 as compared to 31.9 in 1922.

A diabetic person cannot, of course, attain im-

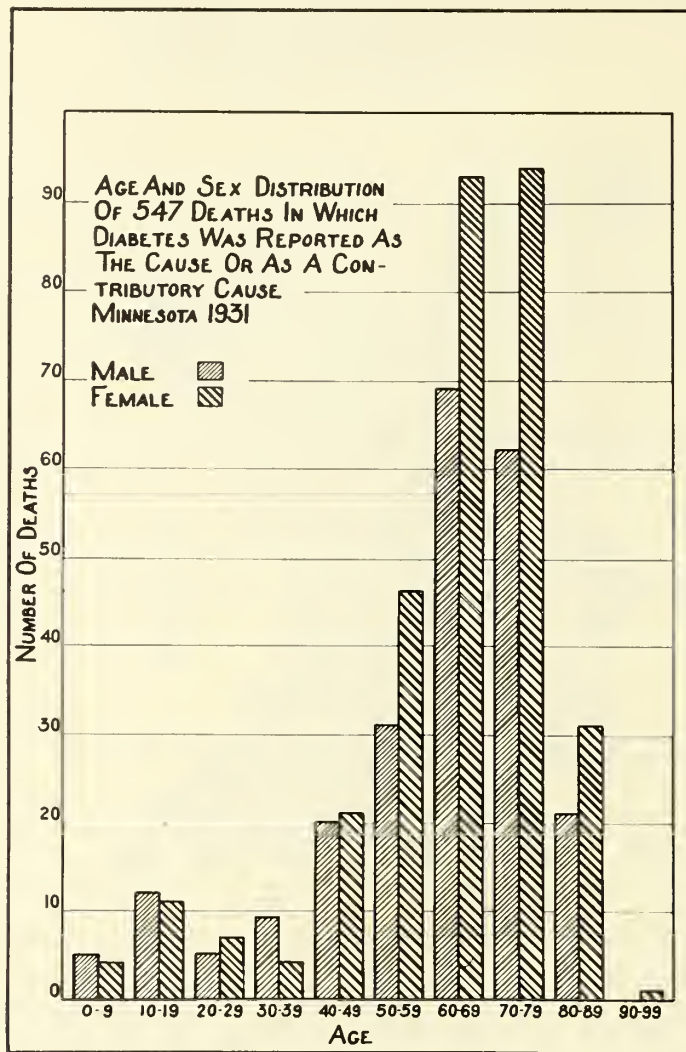


Fig. 7.

and females for the first five decades of life but, thereafter, the females greatly exceeded the males. Of those more than fifty years of age who died with diabetes, 265 were women and 183 were men, whereas the distribution of the general population of the State by sex is about equal for these ages. The predilection of diabetes for older women is thus apparent in Minnesota as it is elsewhere.

Less than 11 per cent of those who died were under the age of forty years (Fig. 7). This figure is like that in the report of Ross and McKinnon, who found the percentage of diabetic

mortality and he must ultimately die from some cause or other, but diabetes itself should not kill. Deaths from diabetic acidosis and coma are preventable, yet coma was responsible for death in 105 of the 375 cases in which replies were received to the questionnaire (Table II). These deaths might have been avoided. The diabetic death rate should be 28 per cent lower than it is. The explanation for our failure to prevent these deaths is as follows: Of the patients in these 105 cases, only sixty-six, or 63 per cent, received insulin at any time during the course of the disease, and only half of them received

TABLE II. PRIMARY CAUSES OF DEATH OF 375 DIABETIC PATIENTS AS DETERMINED BY QUESTIONNAIRE (MINNESOTA, 1931)

		Cases	Per cent of 375*
Uncomplicated diabetic coma		105	28
Cardiovascular and renal disease			
Gangrene	44 (12%)		
Cerebral accident	28		
Heart disease	27		
Coronary disease	18		
Hypertension	7		
Nephritis	10		
Miscellaneous	8	142	38
Infections exclusive of tuberculosis			
Pneumonia	21		
Communicable disease other than pneumonia	2		
Septic infections, boils and so forth	34	57	15
Carcinoma		4	1
Tuberculosis		10	3
No cause of death given		19	5
Miscellaneous			
Fractured hip	8		
Heat stroke	4		
Postoperative shock	4		
Hyperprostate with retention	3		
Gastric hemorrhage	3		
Senility	3		
Intestinal obstruction	2		
Mesenteric thrombosis	2		
Peripheral neuritis, auto accident, bulbar palsy, vaginal bleeding, transverse myelitis, suicide, acute pericarditis, and pernicious anemia, one each	8	38	10
Total		375	100

*Nearest whole number.

insulin during the final illness when acidosis was developing and it was needed most urgently (Table III).

In the experience of the Metropolitan Life Insurance Company, deaths from coma accounted for 41 per cent of 1,044 diabetic deaths in 1929. In a more recent series the figure had fallen to 37 per cent. The figure for Minnesota, as was stated, was 28 per cent, from which it would appear that we are somewhat more enlightened than the average; this, however, is not enough. What we should aim at is the accomplishment of the city of Stettin³ in Germany, where, in a population of 270,000, the number of deaths from coma was reduced to one in 1928 and to none in 1929 and 1930, as the result of a special diabetic campaign. This was accomplished by education of both patients and family physicians.

Cardiovascular-renal disease was responsible for 142 deaths, or 38 per cent, in our series

(Table II). In forty-four of these cases, or 12 per cent of the series, gangrene was present at death, a percentage which is smaller than that

TABLE III. USE OF INSULIN IN 105 CASES IN WHICH PATIENTS DIED DUE TO UNCOMPLICATED DIABETIC COMA, AS DETERMINED BY QUESTIONNAIRE (MINNESOTA, 1931)

	Cases	Per cent of 105*
Uncomplicated diabetic coma deaths		
Insulin used	66	63
No insulin used	39	37
Insulin used during final illness	52	50
Insulin used during final illness only	13	12
Refused insulin	27	26
Too poor to buy insulin	20	19
Dependence on quackery or faith cure	5	5

*Nearest whole number.

TABLE IV. SUMMARY OF INFORMATION OBTAINED FROM QUESTIONNAIRE CONCERNING 375 DEATHS ATTRIBUTED TO DIABETES (MINNESOTA, 1931)

	Cases	Per cent of 375*
Insulin used	235	63
No insulin used	127	34
No record of use of insulin	13	3
Insulin used during final illness	187	50
Patient too poor to buy insulin	47	12
Charity hospital patients	28	
	Total 20%	
Attempts made to secure insulin	23	6
Allowed by charity	17	
Refused by charity	5	
Patient refused to accept charity	2	
Weighed or measured diet used	147	39
Urine tested by patient or guardian	172	46
Other cases of diabetes in household	13 instances	3
Insulin used sometime during the course of diabetes and final illness	130	35
Insulin used during final illness only	50	13
Insulin used sometime during the course of the diabetes but not during final illness	47	12
Insulin used without measured or weighed diet	39	10

*Nearest whole number.

reported in other similar series.⁴ We can take some credit here: gangrene frequently is preventable. Infections of all types, exclusive of tuberculosis, were responsible for fifty-seven deaths, or 15 per cent of the series. Tuberculosis as the cause of death occurred in only ten cases and cancer in only four.

Mention has been made of the number of patients dying from coma who failed to receive insulin. In the entire series the percentage of those who did not use insulin at any time was 34 (Table IV). This is not too creditable. Although many persons with mild diabetes can do without insulin, there probably are few of them who would not benefit by it during the illness that leads to their deaths. There were forty-seven patients who used insulin sometime during the course of their disease but not in the final illness. The reasons for discontinuing it were not always obtainable, but several physicians supplied this information. Three patients resorted to the healing virtues of one or another of the various "cults"; nine refused to use insulin any longer for reasons not given, and several others were too poor to buy it. In a good

many cases it appears that the physician was remiss. In some cases he failed to have confidence in the drug; in others he failed to use it as heroically as is often necessary in the presence of diabetic acidosis. The group of patients who used no insulin at any time included thirty-seven who died in diabetic coma and ten who died with gangrene.

Of the forty-seven persons who were too poor to buy insulin, twenty-six died with uncomplicated coma and six with gangrene. Twenty-three of these patients had made unsuccessful attempts to secure insulin from charitable organizations.

That the general management of diabetes in the State of Minnesota is not what it should be is perhaps best indicated by the fact that only 39 per cent of these patients had at any time followed a weighed or measured diet, and only 46 per cent had learned how to test the urine for sugar. Thirty-nine patients who were using insulin used it without any regard to diet and without testing the urine. These data are comparable to those published by Holcomb, Palmer and Defries and Ross (Table V). In Ontario, insulin is furnished free of charge to those unable to

TABLE V. DEATHS OF PATIENTS WHO HAD DIABETES IN OREGON, WASHINGTON, ONTARIO AND MINNESOTA

Author	Number of deaths	Insulin used, per cent	No insulin used, per cent	Insulin at final illness, per cent	Diet weighed or measured, per cent	Urine tested, per cent
Holcomb Oregon	112	54	41	33	25	37.5
Palmer Washington	226	68	32	53		
Defries and Ross Ontario	192	56	44	33		
Our cases Minnesota	375	63	34	50	39	49.5

buy it, yet it had not been used by 44 per cent of the 192 persons who died of diabetes, and only 12 per cent of these 192 persons had received it with any regularity for a period of time greater than a few months. In a similar series of diabetic deaths in Oregon, insulin had not been used in 41 per cent of the cases in the series, and in only 15 per cent had it been used with any regularity. In the same state only 38 per cent of those who died of diabetes had learned how to test the urine, and only 25 per cent how to plan their diets. The figures obtained in Washington are essentially the same as those in Minnesota.

Summary and Conclusions

These observations prompt the following conclusions:

In Minnesota, 28 per cent of deaths from diabetes are attributable to uncomplicated diabetic coma. These are preventable deaths, and indicate failure to make use of the methods available for the effective care of this disorder.

The Emergency Relief Administration has undertaken to provide insulin to very poor people on the relief lists who suffer from diabetes. This overcomes temporarily one of the difficulties existing in the year covered by my survey (1931). However, the experience in Ontario indicates that the provision of free insulin will not alone solve the problem. What is more necessary is a wider dissemination of knowledge. We have seen what education has done in helping to eliminate tuberculosis. We can expect to accomplish the same for diabetes. Just as was necessary in the tuberculosis campaign, the educational program must reach not only the phy-

sician but the public, and more particularly the patient and his family.

Deaths from coma, unnecessary deaths, can be prevented; that was demonstrated by the German city of Stettin. If this is accomplished, an accompanying benefit will be noted in the health of the living. If in Minnesota almost 200 persons with diabetes die each year unnecessarily, as has been shown, it is clear that many more are incapacitated unnecessarily. The experience of special clinics indicates clearly that a large number of these patients are disabled by their disease. If they are using insulin, they are using it improperly and not deriving full advantage from it. The criterion of successful treatment of diabetes is a normal state of physical and mental vigor. This result is obtainable in most cases, although it is not obtained in many cases today.

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DIABETIC DEATHS IN DULUTH: A STATISTICAL STUDY*

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VITAL statistics of life insurance companies and of the larger municipalities are showing a steady rise in the death rate from diabetes. Drolet¹ reported that in New York City the standardized death rate from diabetes has risen from 17.3 per 100,000 in 1901 to 27.9 per 100,000 inhabitants in 1931 or a true rise of 58 per cent. He stated that the introduction of insulin in 1922 was accompanied by a slight recession in mortality but this has since been lost. De Takats² quoted Wilder as having stated that the death rate from diabetes is actually mounting throughout the entire country. This rise is explained on the basis of improper use of insulin or no use of it. The Report of the Committee on Diabetes, delivered by Wilder,³ at the meeting of the Minnesota State Medical Association in May, 1933, gave the mortality from diabetes for Minnesota per 100,000 population as 22.37 in 1932. For the five-year interval, 1915 to 1919, inclusive, it was 15.8 per 100,000. Wilder showed that the situation in Minnesota was no worse than elsewhere. He attributed the condition to ignorance or indifference on the part of the patient, inability to secure insulin and lack of knowledge about the treatment of diabetes on the part of physicians.

In an effort to study this situation in a small territory, the deaths from diabetes in the city of Duluth were studied. This was done in the city at large and then in two of the larger Duluth hospitals (St. Luke's and St. Mary's). Unfortunately the classified deaths in the city of Duluth were only available for the last three years.

The method of classifying deaths followed by the City Health Department is that of the Manual of International List of Causes of Death. This classification is not satisfactory when an attempt is made to distinguish the number of deaths from coma from the entire group of deaths from diabetes. In many other respects the figures are not suitable for statistical study.

TABLE I. DIABETIC DEATHS IN THE CITY OF DULUTH

Age, years															Total
Less than 15	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to 79	80 to 84	
1930				2	1	1	1	2	3	2	4		1	1	18
1931				1				3	2	2	3	3	2	2	18
1932	1		1				1	1	3	5	3	3	3	2	23

Table I gives the data for the years 1930, 1931, and 1932. The total deaths from diabetes for 1932 showed a marked increase over those for 1930 and 1931. If we are to assume, and rightfully so, that all these deaths which occur in persons who are less than fifty years of age are practically all deaths from coma, we see that this malady is ever with us and diabetics are still dying from this preventable condition. As this paper will show later, immunity to coma does not develop with old age. Therefore, we can also assume that coma is responsible for a large share of the deaths of persons in the older age group.

*Study carried out in Duluth by Dr. Elmer C. Bartels, formerly of the Arrowhead Clinic, Duluth, and Dr. Benjamin Blum, formerly resident at St. Luke's Hospital, Duluth.

Hospital Study

We were able to collect ninety cases in which diabetes was either the primary (coma) or associate cause of death. Forty-seven of these cases were taken from the records of St. Mary's Hospital and forty-three from St. Luke's Hospital. A careful classification of these cases was made, and the deaths due primarily to coma, of which there were twenty-four, were analyzed rigidly. In sixty-six cases diseases other than the associated diabetes were sufficient in themselves to have caused death. Fifty-nine patients in the entire group were females and thirty-one were males. This predominance of females is in

TABLE II. AGE INCIDENCE IN THE ENTIRE GROUP AND IN THE GROUP WITH DIABETIC COMA

	Age, years									Total	Per cent
	1-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89		
Entire group	1	6	6	3	13	16	26	18	1	90	
Diabetic coma	1	5		3	4	5	4	2		24	26

accord with the New York Statistics. The average age at death for the entire group was fifty-four years; the age at death ranged from seven to eighty years. For the group in which death was due to diabetic coma, the age at death averaged forty-two years, and ranged from seven to seventy-three years. Most interesting in Table II is the relatively large number of deaths from diabetic coma in the fifth and sixth decades of life. This rise in number of deaths from coma was expected in the earlier decades but the deaths in the later decades was most astounding and not in accord with the unfounded impression that diabetes in an old individual is always mild. This misconception has been stressed by Patmos, Bartels, and Adams.⁴ Of the entire group of diabetic deaths 26 per cent died in coma.

The deaths from coma by years are shown in Table III. Apparently after the introduction of insulin, it was used with striking results as shown by the few deaths in 1925 and 1926. From 1926 there was an increase to the peak year of 1929 and since then a few each year. Can this be explained on the basis of overconfidence in the use of insulin? Prior to the

introduction of insulin diet was the basis of treatment of diabetes. With the introduction of insulin used in conjunction with dietetic management, there was a marked reduction in the incidence of deaths due to coma. Then it was felt that insulin could take the place

TABLE III. DEATHS FROM 1925 TO 1933

	1925	1926	1927	1928	1929	1930	1931	1932	1933	To July
Entire group	3	11	13	10	15	10	8	15	5	
Cases of diabetic coma	1	2	4	4	5	3	2	2	1	

of the basic part of the treatment, namely, the diet, and subsequently a rise in deaths from coma took place. Most physicians who are successful in managing large groups of diabetic patients still feel that a fixed diet represents the foundation of the treatment of diabetes and that insulin is still of secondary importance. We are likely to have a false security in the use of insulin. That insulin represents only one part of the treatment of diabetic coma will be discussed later in the paper.

TABLE IV. DEATHS FROM DISEASES OTHER THAN THE ASSOCIATED DIABETES

Cardiovascular disease	33
Cardiac disease	15
Cerebral disease	8
Gangrene of feet and legs.....	9
Pulmonary embolism	1
Infection	18
Pneumonia	6
Septicemia	5
Pyelonephritis	2
Parotitis	1
Abscess of the lung.....	2
Pericarditis with effusion.....	1
Sinusitis with associated condition.....	1
Tuberculosis	6
Miscellaneous conditions	9
Operation on gallbladder.....	1
Multiple myeloma	1
Ruptured liver	1
Acute abdomen (type ?).....	1
Carcinoma of stomach.....	1
Carcinoma of pancreas.....	1
Obstructive jaundice	1
(type not determined)	
Cause of death undetermined.....	1
Senility	1

A correlation was made of the causes of death in the group in which death was not due to diabetic coma (Table IV). Deaths from cardiovascular disease lead the group. Nathanson⁵ has

pointed out the marked prevalence of arteriosclerosis in diabetics who are more than fifty years of age. This, of course, accounts for the occurrence of gangrene and to some degree for cerebral and cardiac lesions. Infections of all types were second in order of causes of death in our series. Moen and Reimann⁶ have shown experimentally that there is a diminution of agglutinin response in uncontrolled diabetes. This apparently accounts for lowered resistance of patients with uncontrolled diabetes to infection. Patients with well controlled diabetes do not have this diminution in agglutinin response, therefore, strict control of diabetes at all times is necessary. Tuberculosis was the cause of death in six cases. This appears to be a relatively high incidence. Kramer and Lawson,⁷ in their recent review of the incidence of tuberculosis in diabetics, stated that in their experience tuberculosis does not occur any more frequently in diabetics than in nondiabetics. Also in those cases of diabetes in which tuberculosis has developed, its course was not more unfavorable than in cases in which diabetes was not present, if the diabetes was under control. The miscellaneous conditions (Table IV) were only added for completeness and do not show any significant relationship.

Diabetic Coma

We were anxious to make a searching survey of the twenty-four cases in which death was due primarily to diabetic coma. We attempted to ascertain the cause, if possible, of these appalling and preventable deaths. Certain definite conclusions were permissible from the following data:

Duration of diabetes.—In fifteen cases we were able to obtain the duration of diabetes. It averaged forty-two months, and ranged from three months to ten years. In four cases, the duration was unknown and in five the diagnosis of diabetes was made after the patient's admission to the hospital in coma.

Previous attacks of coma.—Four patients, aged seven, thirteen, seventeen, and eighteen years, had had previous attacks of coma. The child, aged seven years, had weathered three attacks of coma only to succumb in the fourth. Our figures suggest that young individuals endure one or more attacks of coma but in the older age groups coma represents an extremely serious matter and carries a high mortality.

Factors precipitating coma.—Table V shows the conditions, if any, which apparently precipitated the onset of coma. In nine cases mismanagement of the diabetes caused the onset as infection was not present. In all of the other

TABLE V. FACTORS PRECIPITATING COMA

	Cases
None	9
Infection of the upper respiratory tract.....	5
Pneumonia (mild)	1
Pyelocystitis	2
Gangrene of foot.....	2
Ulcer of leg.....	1
Cellulitis of the leg.....	1
Suppuration of the knee.....	1
Erysipelas of the face.....	1
Infection of the finger.....	1

cases a definite sepsis was present, which in most cases was relatively mild and not fatal in itself, but most hazardous in causing coma. Of course, if the patient had been properly trained in the treatment of diabetes during these emergencies, coma in a fairly large percentage of cases could have been prevented. Prevention of coma should be the byword of all diabetic patients. Of course five patients were unaware of the presence of diabetes before hospitalization.

Dietetic management before coma.—The nineteen cases in which diabetes was diagnosed before the onset of coma were studied from the

TABLE VI. DIETETIC TREATMENT PRIOR TO COMA
(NINETEEN CASES)

	Cases
Known diets	
1. Adequate	
C*40, P 50, F 175 (Patient went off diet recently)	
C 70, P 50, F 145 (Patient changed to Q.R.** diet)	
2. Inadequate diets	
C 35, P 45, F 100 (Farmer aged 31 years)	
C 98, P 65, F 106 (Girl aged 17 years)	
C 50, P 50, F 65 (Patient was unable to follow diet)	
C 45, P 36, F 70 (Patient became careless)	
1600 calories (Girl aged 18 years)	
No history obtained regarding diet.....	4
On diet but type unknown.....	3
Abandoned diet	
Six months prior to coma.....	1
When upper respiratory infection began.....	1
Never placed on a diet after diagnosis.....	1
Miscellaneous	
On diet but never controlled.....	1
On a "poor diet".....	1
**—Qualitative Restriction.	
*C—Carbohydrate	
P—Protein	
F—Fat	

standpoint of previous dietetic management. In seven cases (Table VI) we were able to obtain the exact diet by previous hospital admissions

and diet slips. Only two of the seven patients were on an adequate diet and they had abandoned the diet shortly before the onset of coma. Five of the seven patients were on diets which were extremely inadequate, as is shown by the low caloric content. Because of the low caloric and satiety value a patient could not be expected to remain on such a diet for any period of time. Two patients abandoned their diet, one, six months prior to the onset of coma and one patient when a cold began. One patient was never placed on a diet because she was told that her diabetes was mild. Of two other patients of a miscellaneous group, one was on a diet but the diabetes was not controlled, and the other was on a "poor diet" as stated by the relatives. Apparently poor dietary management was an important factor in the etiology of coma.

Treatment with insulin before coma.—Of the nineteen patients with known diabetes before the onset of coma, six (31 per cent) were definitely known never to have used insulin. In five cases no definite statement was obtained as to whether the patient had taken insulin or not. The eight patients who took insulin rarely used it accurately. From our data on the usual régime in diet, it was inconceivable that insulin would be used with any greater care, and this was borne out in the study. One patient took 8 units three times a day and always had sugar in the urine. Two patients took 10 units three times a day. One patient who used 10 units three times a day had abandoned its use four months before the onset of coma. One patient used 20 units three times a day. One patient stopped the use of insulin when a cold began, which precipitated coma. One patient used three or four bottles of insulin a week while on a qualitative restriction diet. One patient used varying amounts.

De Takats and Fenn² stated that in Ontario where insulin is provided free of charge to charity patients none had been used in 44 per cent of 192 fatal cases of diabetes and in only 12.5 per cent had it been used with any regularity. In Illinois insulin had been used regularly in only 15 per cent of the fatal cases.

Onset of coma.—Nineteen patients were admitted to the hospital in coma, in ten of whom the duration of the coma before admission was known. It varied from a few hours to fifty hours as follows: in four cases between one and ten hours; in two cases between ten and twenty

hours; in one case between twenty and thirty hours; in one case between thirty and forty hours; in two cases between forty and fifty hours. Five patients went into coma in the hospital while under observation for diabetic or surgical conditions. Of these, one patient was admitted because of a traumatic ulcer of the leg which was treated without appreciation of the diabetic condition. After coma developed the condition was recognized, but in spite of treatment death occurred five hours later. One patient was admitted for a mild diabetic acidosis; coma developed rapidly and death occurred three and a half hours later. In this case the acidosis was not promptly treated on admission to the hospital. One patient went into coma three days after admission for observation for a supposedly mild diabetic acidosis, and died forty-eight hours later in spite of vigorous treatment. One patient had been operated on for an acute appendicitis before a mild diabetic acidosis was controlled. She lapsed into coma shortly after operation and died fifty-nine hours later. One patient went into coma six days after admission for a mild acidosis. In this case the physician stated that "the patient couldn't tolerate insulin so it could not be used." This patient had vigorous intravenous medication with soda bicarbonate without avail. Although it might be surmised that seeing a patient shortly after the onset of coma is essential for good results, it is also true that once a patient is in coma the condition is extremely serious. This can be shown by the deaths that followed the onset of coma in the hospital. It follows logically, therefore, that the most important part of the treatment of diabetic coma is prophylaxis.

Treatment.—Immediate treatment of the coma was instituted in only a small number of cases on admission to the hospital in this series. Only six patients received immediate care. The time elapsing before treatment was begun after admission was variable in thirteen cases. In five cases one hour, in one case one and a half hour, in one three hours, in two cases three and a half hours, in one case five hours, in two cases nine hours, and in one case fifteen hours elapsed before treatment was begun. The necessity for prompt treatment cannot be stressed too strongly. Every minute lost decreases the chance of recovery.

Administration of insulin was the basis of

treatment in twenty-two cases. The amount given during coma varied from 50 units in five cases to as high as 930 units in one case. Between these two extremes six patients received between 50 and 100 units; two, between 100 and 150 units; two, between 150 and 200 units; two, between 200 and 300 units, three, between 300 and 400 units; and one patient between 400 and 500 units. The average amount given in twenty-two cases was 177 units. If insulin is the most important factor in the treatment of diabetic coma most of these patients should have survived, as almost all received substantial doses.

TABLE VII. BLOOD SUGAR STUDIES

Grams per 100 c.c. of blood	
On admission	Terminal
750	333
685	
660	125
555	
513	
504	
500	272
500	200
450	
429	110
416	
402	96
400	
375	
368	
300	250
300	
300	
166*	
Average 451	197

*Patient had received 80 units of insulin before admission.

That this is not true must be accepted from this study and can be shown from the studies on blood sugar (Table VII). Of the entire group in which blood sugars were taken before and after treatment with insulin, there was, in most cases, a drop in blood sugar to a point within favorable range. In the case of a child, aged seven years, who was admitted to the hospital in profound coma with a blood sugar of 166 gm. in 100 c.c. of blood, 80 units of insulin had been given before admission. Apparently blood sugar is only one feature in a case of diabetic coma and the sugar response has little bearing on the ultimate outcome.

A probable error in the treatment of these cases was failure to restore body fluids and

counteract the concentration of the blood, thereby preventing circulatory collapse, which is responsible in a large part for death in diabetic coma. Intravenous administration of glucose was used in eleven cases, hypodermoclysis in ten cases, proctoclysis in seven cases and in some of these cases combinations of fluids were administered. Lande⁸ has stated that "the degree of dehydration appears to be more unfavorable prognostically than either the degree or duration of coma." He attempted, however, to show that in the late stages of coma administration of fluids is occasionally of no advantage because of the existing capillary damage.

Summary and Conclusions

1. There is a dire necessity for better control of patients with diabetes. Mild as well as severe cases need to be under continued control. Coma prophylaxis should be paramount.
2. Patients must have better training in regard to dietary and insulin management. They must have sufficient knowledge to handle their condition during emergencies, such as sickness.
3. Infections, no matter how mild, may rapidly lead to coma. Preoperative control of diabetes is necessary as an uncontrolled case carries a high risk.
4. In all old patients with diabetes, no matter how mild their condition may seem, coma may develop. Older diabetics tolerate coma poorly.
5. Every case of diabetic coma requires emergency treatment of the most sincere and energetic type. Close clinical and laboratory observations are essential.
6. We are likely to have a false security with the use of insulin in the treatment of coma. Insulin represents only one phase in the treatment of diabetic coma as was shown by the relatively low blood sugars at the time of death in a number of cases.

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SURGERY IN DIABETES*

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Little more than a decade ago, as Joslin tells us, "there were few diabetic patients and their life was short and firmly bound with chains of acidosis and under-nutrition. Today there are many diabetics because they live longer and insulin has set them free." He estimated that every third person who had diabetes and probably "every other diabetic at some time during the course of his disease needs the surgeon and will seek him not in vain, provided he secures the coöperation of accurate and interested technicians, faithful nurses, and doctors conversant with diabetes."

Operating on patients with this disease formerly involved a hazard which few surgeons were willing to accept. The rates of mortality encountered varied from 18 to 46 per cent, and although this was due in some degree to operating mostly for emergencies as a measure of last resort, it was largely attributable to the lack of effective means for preventing the development of acidosis. The hazard in these cases is still serious but may be overcome by employing skillful surgery, the best possible anesthesia, and modern methods of controlling acidosis. Trauma to tissue, shock from loss of blood, and prolonged anesthesia are poorly borne especially in diabetes; neglect of these patients before and after operation often leads to dangerous acidosis. The attendance of physicians and nurses who possess special experience in diabetes is desirable, and closest coöperation between surgeon and physician is imperative. Every case in which operation must be performed in the presence of di-

abetes is a potential case of coma and should be treated accordingly.

Necessary Medical Attention

In the presence of surgical emergencies nothing is to be gained by delaying operation; indeed, when a curable infection exists, delay may be actually harmful. This applies especially to amputations of the extremities for rapidly spreading gangrene with infection and to acute appendicitis, pelvic abscesses, mastoiditis, and other inflammatory processes. Acute infection favors the development of resistance to insulin and its removal is therefore the primary consideration. A single subcutaneous injection of 20 to 30 units of insulin should be made, together with injection by vein of 1,000 c.c. of physiologic saline solution; the operation is then performed without further hesitation. On the other hand, when a surgical lesion is not infected, or when an existing infection is chronic, and has little or no influence on metabolism, there is no such excuse for haste, and time should be taken to secure the most favorable conditions before operating. The aims are complete freedom from acidosis, a sugar-free urine, and adequate reserves of glycogen, fluids, and salts. When the diabetes is uncontrolled and complicated by acidosis, marked dehydration results and this, in turn, adds to the risks of surgical shock. Water is lost in the course of operations on patients who do not have diabetes, especially when general anesthesia is used. Neuburgh computed the amount of water lost to be as much as 6 to 7 liters and attributed much postoperative shock to the resulting deficiency of fluid.

*From the Divisions of Surgery and Medicine and Section on Orthopedic Surgery, The Mayo Clinic, Rochester, Minnesota. Read before the Ramsey County Medical Society, St. Paul, Minnesota, December 18, 1933.

Attention Before Operation

The routine procedure at The Mayo Clinic has been as follows: The patient is observed in the hospital for two or more days while a measured diet is prescribed and sufficient insulin is used to clear the urine of sugar and to free it of ketone bodies. The diet for these patients is made somewhat richer in carbohydrate to provide extra glucose for storage as glycogen, but we have not found it necessary to resort to very high allowances of carbohydrate such as have been recommended by various clinics. None of our preoperative diets have contained more than 170 gm. of carbohydrate. If dehydration is apparent, fluids are given by rectum or by vein. On the morning of operation both breakfast and insulin are withheld. Occasionally a small dose of insulin is injected before the patient goes to the operating room; usually this is not given.

The Anesthesia and Operation

The choice of the anesthetic depends on the surgical indications. General anesthetics are poorly borne in diabetes. They produce some

available is as follows: local, spinal, nitrous oxide and oxygen, ethylene and oxygen, and ether. However, when ether can be expected to provide better relaxation and therefore to expedite and shorten time of operation or to reduce the degree of surgical trauma, it may be preferred (Table 1). In some clinics an intravenous injection of insulin and glucose is given during the course of operation. We have not found this necessary. The most important single factor is that the surgical procedure should be carried to completion with accuracy and celerity. A minimum of trauma and a minimum of anesthetic time are crucial.

Attention After Operation

As soon as the patient has returned to his bed he is treated with insulin and injections of fluid. Saline solutions are preferred to solutions of glucose, because glucose, given parenterally, escapes the glycogen barrier of the liver and is in part excreted in the urine. This vitiates urinalysis as the gauge to the amount of insulin needed. Sugar is usually in high concentration in the blood of the diabetic patient, and for a time at least it seems unnecessary to provide additional sugar. The dose of insulin must be judged at first from periodic determinations of blood sugar. Later, when excretion of urine begins, each specimen of urine, as it is voided, is immediately analyzed for sugar, and these analyses enable a reasonably accurate appraisal of the demand for insulin. It is well to remember that the time of action of insulin is shortened by anesthesia, infection, and surgical trauma, and that the intervals between injections must be shortened. At least one injection every six hours is required, but no absolute rule about this is safe. Oral feeding is started as early as possible, usually after twenty-four hours. At first fruit juices alone are given, or ginger ale, or 10 per cent solutions of glucose. Later a more liberal diet is gradually resumed.

The danger of overdosing with insulin should be constantly in mind. We attribute one of our fatalities to insulin shock. The patient went into shock four hours after operation, and, although he was restored to consciousness, fatal bronchial pneumonia developed and may have been precipitated by the period of apnea that accompanied the severe insulin reaction. The physician in charge of these patients must be trained to

TABLE 1

ANESTHETICS USED IN OPERATIONS ON DIABETIC PATIENTS—1930

Type	Cases	Per cent
Local and regional	109	43.25
Local and gas*	15	5.95
Local, gas and ether	4	1.59
Spinal	35	13.39
Spinal and gas	18	7.14
Spinal, gas and ether	4	1.59
Gas (nitrous oxide and ethylene)	14	5.56
Ether and gas	47	18.65
Ether	5	1.98
Ether, gas and sodium isoamyl-ethyl barbiturate	1	0.39
No anesthetic	38	13.10
Summary		
Local used in	128	50.79
Spinal used in	57	22.61
Gas used in	103	40.87
Ether used in	61	24.20

*Throughout this table gas means nitrous oxide and ethylene, alone or together with oxygen.

degree of hyperglycemia and acidosis in normal persons, and postoperative vomiting and unavoidable starvation intensify this. The order of choice of the anesthetic methods and agents

recognize quickly any evidence of metabolic abnormality. Acidosis threatens on the one hand, hypoglycemia from over use of insulin on the other. It is probably safer to err on the side of too little control than too much, at least for the first day or two after operation, and until the patient can begin to coöperate effectively. Slight glycosuria will do little harm; an attack of insulin coma has much more serious consequences.

TABLE 2

MORTALITY OF OPERATIONS IN DIABETES

	Registra- tions	Operations		Total	Deaths	Mortality per cent
		Major	Minor			
Oct. 1, 1921, to Oct. 1, 1925*	2095	304	363	667	20	3.0
1926	702	99	115	214	4	1.8
1927	765	91	104	195	11	5.6
1928	709	79	72	151	7	4.7
1929	782	103	72	175	5	2.9
1930	840	136	152	288	5	1.7
1931	782	109	108	217	6	2.8
1932	634	107	72	179	11	6.0
	7309	1028	1058	2086†	69‡	3.3

*Previously reported.

†28.5 per cent of all registrations.

‡Includes all deaths following amputations for gangrene.

Surgical Statistics

By adhering to the principles recounted it has been possible for us to hold the mortality of operations on diabetic patients at a rate that compares favorably to that obtained in The Mayo Clinic when operating on patients of comparable age who have diseases of comparable seriousness, but not complicated by diabetes. It must be remembered that more than 60 per cent of diabetic patients who present themselves for treatment are fifty years of age or more, and that age affects operative hazard more unfavorably than any other single factor. Judd, Wilder and Adams previously reported the operations on diabetic patients for the period of October 1, 1921, to October 1, 1925. There were, in that period, 304 major and 363 minor surgical procedures, or a total of 667 operations with twenty deaths. The mortality rate was 3 per cent. A review of the operations for the seven years from 1926 to 1932, inclusive, indicates that this record has been very nearly maintained over a much longer period. The grand total of the two

series makes 2,086 operations, 1,028 major and 1,058 minor surgical procedures. The deaths number sixty-nine, a mortality rate of 3.3 per cent (Table 2).

The classification of the operations of this series into major and minor groups is in accordance with the procedure of The Mayo Clinic for classification of all operations. Multiple procedures on separate dates are counted as separate operations; multiple procedures on the same date are counted as one operation and listed under the principal procedure. This means that many

TABLE 3

OPERATIONS ON DIABETIC PATIENTS, 1932:
NUMBER OF PATIENTS 140

Region of operation	Major	Minor	Total	Deaths
Brain	3	2	5	
Spinal cord	1		1	
Eye, cataract	10		10	
Eye, other	1	2	3	
Ear	1		1	1
Nose		1	1	
Throat, tonsils		4	4	
Throat, other				
Face, lips, tongue		4	4	
Teeth		14	14	
Skin, carbuncle	1	1	2	
Skin, other		3	3	
Neck, goiter	19		19	
Neck, other	2	3	5	2
Breast	3		3	
Thorax	1	1	2	
Esophagus, stomach, small intestine	4	3	7	1
Appendix	3		3	
Large intestine	5	1	6	
Rectum		4	4	
Gallbladder and bile ducts	10		10	2
Other abdominal operations	3		3	1
Hernia	1		1	
Kidney, ureter, supra- renal glands	1	1	2	
Urinary bladder	1	1	2	
Male genital organs, prostate gland	10		10	
Male genital organs, other	2	1	3	
Female genital organs	12	5	17	
Bones and joints	5	1	6	
Extremities	7	10	17	3
Paracentesis		1	1	
Transfusions		9	9	1
Miscellaneous	1		1	
Total	107	72	179	11

TABLE 4

DEATHS OF PATIENTS WITH DIABETES WHO UNDERWENT SURGICAL OPERATION, 1932

Case	Age, years	Grade of diabetes	Operation	Cause of death
1	66	4	1-25-32 amputation of left leg below knee; application of posterior splint	Gangrene of stump, amputation
2	65	3	2-24-32 partial gastrectomy; 2-25-32 transfusion; 2-27-32 transfusion	Carcinoma of stomach; pneumonia
3	72	Mild	3-14-32 transfusion; 3-17-32 cholecystoduodenostomy	Carcinoma of head of pancreas; bronchopneumonia
4	61	3	3-23-32 abdominal exploration	Hemorrhagic pancreatitis
5	58	4	3-30-32 complete mastoidectomy; 4-9-32 ablation of the left sigmoid sinus; 4-11-32 ligation of left internal jugular vein; 4-17-32 transfusion	Chronic otitis media and mastoiditis; bronchopneumonia
6	66	3	4-30-32 excision of gland, right posterior cervical region, for study	Infarction of left ventricle
7	61		5-9-32 embolectomy of right femoral artery	Coronary sclerosis with hypertension; embolic gangrene of legs
8	55	Latent	5-6-32 plastic operation of neck; actinodermatitis	Acute streptococcal sepsis
9	76	1	8-23-32 amputation of right leg; gangrene of right foot	Gas gangrene stump of right leg
10	60		9-9-32 cholecystectomy	Chronic cholecystitis; acute empyema; ileus graded 3; auricular fibrillation
11	46	4	9-16-32 transfusion; secondary anemia	Adreno-cortical syndrome

operations, listed as single operations, are in fact multiple operations.

The major operations include: the procedures in which a body cavity (pleura, peritoneum, joint, eyeball) is entered by a knife; operations on the thyroid gland, hernia and prostate gland; resection of a cataract and iridectomy; ventriculogram; open operation for fracture; manipulative reduction of fracture of hip, spine or pelvis; all amputations of arms, legs, hands, feet, fingers or toes, and incision of carbuncles.

The minor operations include: aspiration of all kinds; operation on the eye in which the eyeball is not entered; tonsillectomy and adenoidectomy; encephalogram; manipulative reduction of fractures of extremities; resections primarily done for purposes of biopsy; hemorrhoidectomy; endoscopy of all kinds, except transurethral prostatic resection; drainage of all abscesses except carbuncles; transfusions of blood, and treatment of varicose veins by multiple injections at separate dates (one minor operation).

Reapplication of casts, removal of drainage

tubes, removal of sutures, other surgical dressing, and intravenous injection of fluids and drugs are not listed as operations.

A classification of operations performed in 1932 is shown in Table 3. Allan and Judd, Wilder and Adams, have published similar classifications for previous years. The severity of the diabetes in the series as a whole varied from mild to severe, with about half of all patients requiring insulin to make possible their adequate nutrition.

It should be emphasized that no patient, after October, 1923, has been refused the benefits of surgery on the ground of diabetes. Selection of patients for operation has been made on the basis of exactly the same indications as those followed for selection of patients who are not afflicted with diabetes.

The causes of death in the fatal cases of the series do not include diabetic coma. Severe diabetic acidosis has been avoided in every instance. The patients died from the type of post-operative complications met in all surgical prac-

tice (Table 4). An exception may be the case mentioned in the foregoing, in which an overdose of insulin precipitated apnea and was followed by fatal bronchial pneumonia. Among the

was withheld, and when the ensuing diabetic state was developed, abdominal incisions were made under local anesthesia. As compared to the behavior in identical wounds, in healthy ani-

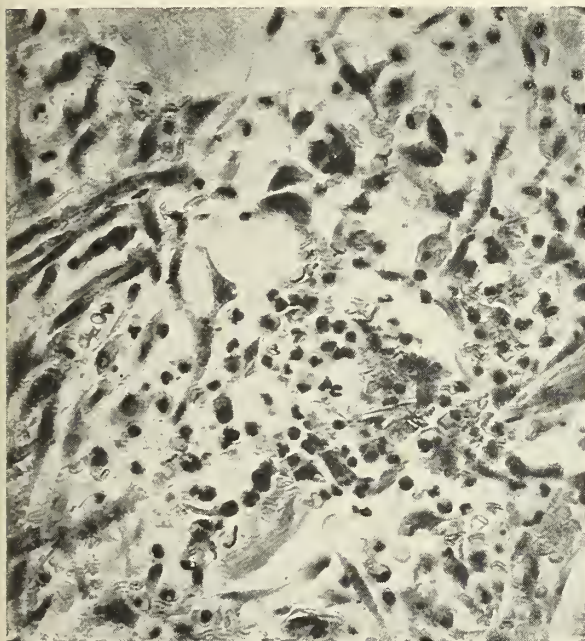


Fig. 1. Normal organism (experimental wound). Cellular exudate of clot between cut ends of dermis in wound three days old; clear-cut appearance of cells; transition forms of fibroblasts; moderate cellular infiltration; conservative deposition of polymorphonuclear neutrophilic leukocytes; fibrin forming the basis for the cellular infiltration; orderly arrangement of cells (x400). (Permission of R. J. Bennett, Jr.)

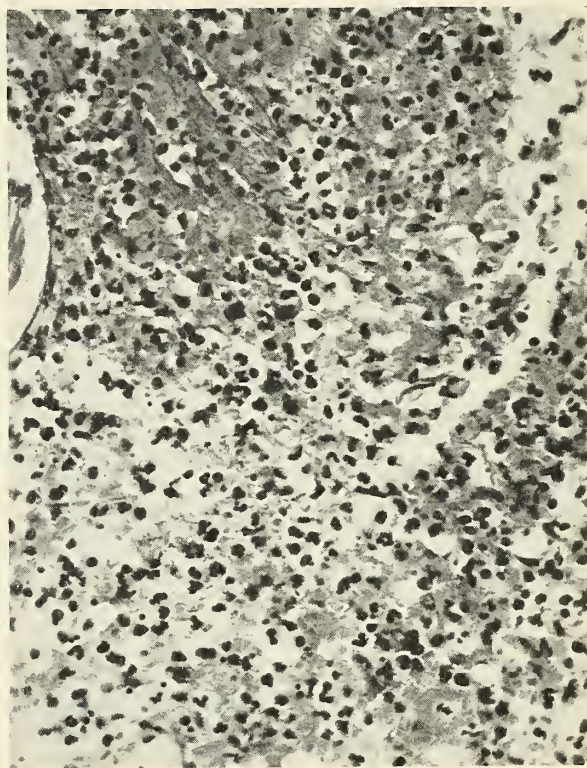


Fig. 2. Diabetic organism (experimental diabetes and experimental wound). Cellular exudate of clot between cut ends of dermis in wound three days old; hazy appearance of cells; no evidence of fibroblasts; massive cellular infiltration; marked predominance of polymorphonuclear neutrophilic leukocytes; disorderly cellular arrangement (x400). (Permission of R. J. Bennett, Jr.)

sixty-nine deaths are the ten that followed amputation for diabetic gangrene.

In the period of eleven years covered by this review, the diagnosis of diabetes occurs in 7,309 registrations. About a third of the patients concerned had registered more than once. This means that about 4,800 patients underwent about 2,100 operations, which bears out Joslin's estimate, already mentioned, that "probably every other diabetic at some time in the course of his disease needs the surgeon."

Healing of Wounds

The healing of surgical incisions is delayed when treatment of diabetes is inadequate; not otherwise. Bennett recently has completed the study of surgical wounds in dogs made diabetic by pancreatectomy. The pancreas was removed under ether anesthesia. The animals were supported with insulin and a suitable regimen until they had recovered completely. Then insulin

was withheld, and when the ensuing diabetic state was developed, abdominal incisions were made under local anesthesia. As compared to the behavior in identical wounds, in healthy animals used as controls, the healing of these wounds was abnormal. The tissues were edematous, deposit of fibrin was delayed, and the amount of fibrin was restricted. The cellular reaction was excessive and the exuded cells appeared to be of the so-called "toxic" type. New blood vessels were slow to form, and more thrombosis than normal was noted in preformed vessels (Figs. 1 to 4). On the other hand, healing proceeded perfectly normally when the diabetes was well controlled. The delayed healing of the extremities of diabetic patients who have undergone amputations for gangrene is attributable to atherosclerotic obstruction to the peripheral circulation.

Gangrene

Allan and Kintner recently have reviewed our experience with the serious complication of

gangrene. Table 5 gives the essential data. The lesson to be drawn from it is obvious: Either operate early and operate high or treat the lesion medically and avoid all surgery. This old rule has guided us through the last decade to a mortality in diabetic gangrene that is comparatively very low. When we deviated from it, as we did occasionally, we had reason to regret it. Primary amputations through the foot for removal of gangrenous toes was performed in fifteen cases. Higher amputation was necessary in a third of these. The ultimate outcome was fatal in 20 per cent of cases. By contrast, in seventy-one cases of gangrene of the toes or foot, in which primary amputation was through the leg, a secondary operation was required in only four cases, and the ultimate outcome was fatal in only 7 per cent.

TABLE 5
CASES OF DIABETIC GANGRENE OF TOES AND FEET:
1922 TO 1931 INCLUSIVE
(data furnished by Allan and Kintner)

	Cases*	Successful	Deaths	Mortality, per cent
Treated medically	69	43	16	23
Treated surgically	86	74	8	11
Primary amputation below ankle (higher amputation later in 5)	15	7	3	20
Primary amputation above ankle (higher amputation later in 4)	71	62	5	7

*Necrosis of tissue of considerable degree in all these cases; infections not accompanied by massive decay of tissue; perforating ulcers and other sores not included.

Attempts to save feet by amputation of toes, by open drainage, and by other procedures unquestionably are hazardous. The fifteen cases chosen for such attempts were suitable by all ordinary criteria: the gangrene was limited to the toes, the pulsation of the dorsalis pedis and posterior tibial arteries was fair, the extremity was warm, and there was no great difference in blanching or reddening on elevating or lowering the leg. Yet the mortality rate in this group almost equals that observed in sixty-seven cases (Table 5) in which medical treatment alone was provided. Once amputation is decided on it

should be done below the knee, provided pulsation is good in the popliteal artery; above the knee if pulsation is inadequate. A well-fitting artificial leg, or even a wooden peg, is to be considered an asset in the light of the danger of imperfect healing of wounds after amputation. These observations do not apply to perforating ulcers, other sores, and other chronic infections of the feet which are not accompanied by massive necrosis of tissue or obvious impairment of circulation. In such cases the leg usually can be saved. When infection is superimposed on arteriosclerosis, and if it is clearly advancing and reaches the ankle, high amputation is desirable and should be done without delay.

The medical care for infected extremities, with or without gangrene, is as follows: Absolute rest in bed is enforced; the foot is slightly elevated above the horizontal; glycosuria is rigidly controlled. A high renal threshold for glucose develops in many cases of diabetes of long duration, and under these circumstances the tissues may require a concentration of blood sugar that is higher than normal. Consequently it is not desirable to force the blood sugar lower than is necessary to avoid glycosuria.

If the gangrene is dry and not grossly infected, a dry dressing is used at the site of the lesion, but if infection is present, the old Ochsner dressing of gauze and cotton is used. These are made 1 inch thick and saturated with a mixture of equal parts of 50 per cent alcohol and saturated solution of boric acid. We have seldom considered it expedient to resort to multiple incisions for drainage of tracking abscesses, or to the Carrel-Dakin type of irrigation. The infection either starts to subside within twenty-four hours after starting the measures enumerated, or by this time gives clear evidence of advancing. If it subsides, the treatment is continued until it is fully controlled, and then the decision is made as to whether the degree of the accompanying gangrene or the degree of circulatory impairment justifies amputation. If the infection fails to subside after twenty-four hours of treatment with alcohol and boric acid, amputation is usually recommended. If the redness and swelling extend beyond the ankle, immediate amputation is urged.

Ulcers and Other Sores

Lesions of the feet that are not accompanied by gross impairment of circulation as a rule are

caused by infection. They include infected corns and calluses, perforating ulcers, osteomyelitis, burns, frost bite, varicose ulcers, and septic abrasions. Osteomyelitis of a phalanx should be

sary delay in the treatment of these infectious conditions. Diabetic patients should learn to treat all abrasions seriously, and immediately to apply a nonirritating antiseptic, such as the mix-

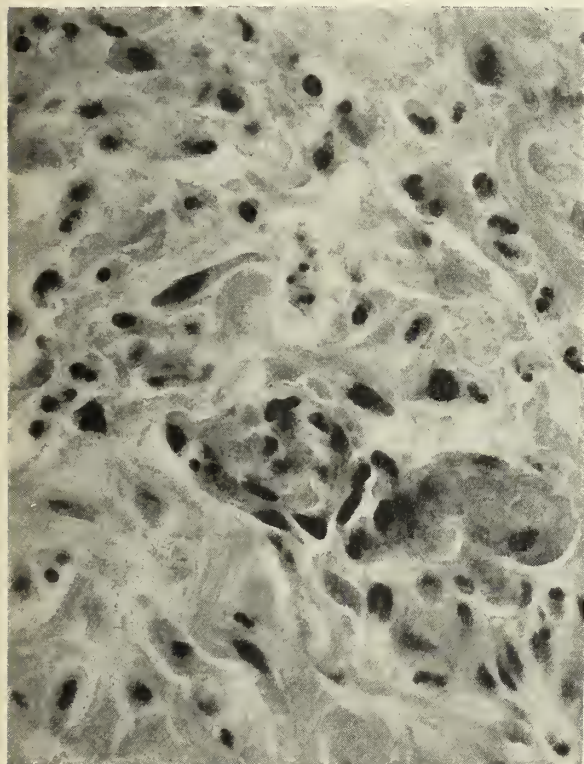


Fig. 3. Normal (experimental wound). Cellular infiltration of dermis in wound five days old; clear-cut appearance of cells; moderate polymorphonuclear neutrophilic leukocytic infiltration; mononucleated cells are smaller in size and greater in numbers; the total cellular infiltration is less than in Figure 2; the dermis appears firmly arranged (x900). (Permission of R. J. Bennet, Jr.)

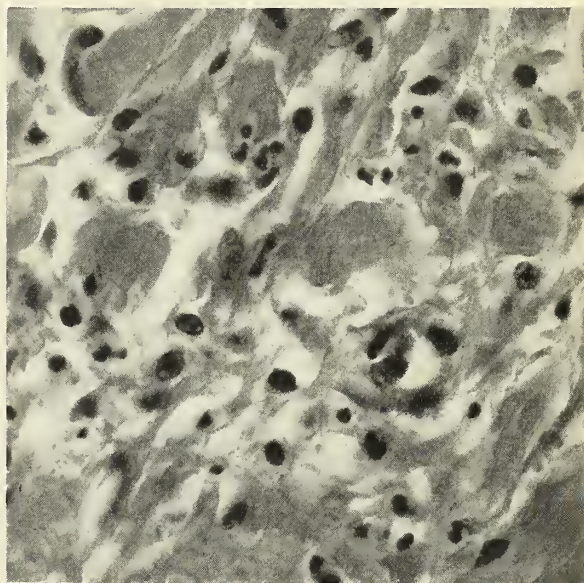


Fig. 4. Diabetic organism (experimental diabetes and experimental wound). Cellular infiltration of dermis in wound five days old; hazy appearance of the cells; predominating polymorphonuclear neutrophilic leukocytic infiltration; mononucleated cells are larger in size and smaller in numbers; total cellular infiltration more than in normal section; dermis appearing loosely arranged (x900). (Permission of R. J. Bennet, Jr.)

suspected (McKittrick and Root) in every localized infection of more than two weeks' duration in any part of a toe or foot. The diagnosis is made roentgenologically or by encountering rough bone with the probe. The perforating ulcer, and indeed many of the indolent, infectious conditions of the feet in diabetes, may in part be dependent on the presence of peripheral neuritis. Almost always the feet are abnormally insensitive, and complaints of numbness and of aching pains at night are common. However, a factor that probably is of primary importance in most cases is a scanty blood supply. Woltman and Wilder have considered the principal reason for the neuritis of diabetes to be interference with the blood supply of the nerves. Often much needless suffering results from unneces-

ture of boric acid and alcohol. Prophylactic measures also are important: clean socks and well-fitting shoes.

The treatment of the advanced lesion is essentially the same as the medical treatment described under gangrene. Thick calluses must be removed mechanically. It is possible in many cases to improve the peripheral blood flow by vasodilating drugs and thereby to hasten healing. Among such drugs, theobromine in doses of 10 to 15 grains (0.65 to 1 gm.) three times daily has proved effective, as has also pancreatic tissue extract. The treatment in these cases, and in cases of gangrene in which operation is declined, includes the use of therapeutic measures directed at the circulation: daily massage, contrast baths, and postural exercises of the Buerger type. It is important to remember that the skin of diabetic patients with arteriosclerosis will burn and blister at temperatures well below those which would not be injurious otherwise, and that any application of heat demands exercise of ex-

treme caution. The same caution is important in applying roentgen treatment to extremities of diabetic patients. We have seen two cases of diabetic necrosis of tissue which followed treat-

who paid little or no attention to the treatment of their disease.

As Leddy and Morton have reported, roentgen rays may hasten localization in carbuncle and may



Fig. 5. Carbuncle of a patient with diabetes. *A*, after control of infection, showing extensive destruction of skin; *B*, after healing. Pinch grafts were used.

ment elsewhere with doses of roentgen rays that were of average therapeutic magnitude. Exposures to sunlight or ultra-violet light also are beneficial, but caution to avoid burning is again necessary. A general rule that seems to have helped in our hospitals is that no hot water bags or other applications of heat are to be made below the knees of diabetic patients without the written order of the physician or surgeon who is responsible.

Carbuncles

Carbuncle is a deadly complication in diabetes. The mortality rate is reported as from 25 to 60 per cent. Fortunately it occurs infrequently and is nearly always preventable by cleanliness and proper attention to the control of glycosuria. The cases we have seen have been those of obese patients who were uncleanly in their habits and

lessen pain. The most important prophylactic measure is the admonition of Price on the subject of pimples and boils, "Don't squeeze, don't prick, don't cut." To this McKittrick and Root properly add, "Don't show sugar, and do respect an infection no matter how small it may be." A further wise admonition is to avoid the customary shaving of the neck at the barber shop. Boils are frequently due to infection from barbers' razors, and carbuncles may follow boils. It is wise for the diabetic patient to use a private razor. The wide crucial incision extending throughout the zone of induration seems a particularly bad form of treatment. It must lead to extension of infection and septicemia in many cases. It is fortunate that carbuncle occurs infrequently. McKittrick and Root reported only nineteen cases of it in four and a half years in the very large diabetic service at the Deaconess

Hospital. Our incidence is still smaller. We have had sixteen cases in eleven years. In many of these we have obtained good therapeutic results by injecting methenamine intravenously, and at the present time in cases of diabetes we are avoiding operation entirely. The essential items in our treatment are: (1) absolute rest in bed, (2) rigid control of glycosuria, (3) thick gauze and cotton dressing saturated with equal parts of boric acid and 50 per cent alcohol, kept hot, (4) daily intravenous injection of 40 per cent solution of methenamine for seven days. After central necrosis of the carbuncle has occurred and natural drainage has established itself, but not until then, a pair of sterile artery forceps is introduced and gently opened to hasten drainage. Occasionally the destruction of skin necessitates skin grafting, but this is not the rule (Fig. 5).

A discussion of the rationale of methenamine in septicemia and other infections is given by Buzello, de Takats and others. The dose we have used is large enough so that traces of formaldehyde can be demonstrated in pus taken from the center of the carbuncle. The growth of bacteria is probably inhibited by this trace of formaldehyde, and possibly also the natural defenses of the organism are stimulated by the drug.

Six of our sixteen diabetic patients with carbuncle did not receive methenamine and two of these died, both following wide crucial incision of the lesion. Ten of the patients received the injections, and among these there was only one fatality. This patient had had the infection for seventeen days before he came to us. He was then treated for eleven days with bacteriophage and typhoid vaccine, without benefit. Separate furuncles developed in other parts of the body. Blood cultures were positive on two separate days. Methenamine was given at this late date, and three days afterward a blood culture was negative and symptomatic improvement was noted. For unexplained reasons, injections of methenamine were discontinued, and five days afterward the patient died. Necropsy revealed suppurative nephritis and multiple subcutaneous and other abscesses in addition to the carbuncle.

We have used methenamine in other cases of sepsis with what appeared to be beneficial results. One patient with staphylococcal pyemia, multiple abscesses, and myelitis in the body of a vertebra,

recovered from what we thought was a perfectly hopeless condition. The method deserves further trial, particularly since the drug is harmless in the dose recommended. Some hematuria may be seen after seven or eight days of injection, but this stops at once as soon as the daily injections are discontinued. The occurrence of ten successive cases of diabetic carbuncle, with only one death, is worthy of consideration.

Summary and Conclusions

1. A low (3.3 per cent) mortality rate in a series of 2,086 operations of all kinds on patients with diabetes (sixty-nine deaths and none of these from acidosis) is attributable to expeditious surgery, short anesthetic time and close medical supervision after operation.

2. The healing of wounds is delayed in uncontrolled diabetes but proceeds normally when glycosuria and acidosis are controlled.

3. Of 155 cases of diabetic gangrene of the lower extremities, in sixty-nine treatment was conservative, with a mortality rate of 23 per cent; in fifteen treatment was by amputation of toes, with a mortality rate of 20 per cent; in seventy-one treatment was by primary amputation of the leg, with a mortality rate of 7 per cent. The old dictum, "Either operate early and operate high or treat the lesion medically and avoid all surgery," must be adhered to if loss of life from gangrene is to be minimized.

4. Lesions of the feet not accompanied by massive necrosis of tissue or grossly impaired circulation are almost always amenable to medical treatment.

5. Carbuncle is usually accompanied by a mortality rate of from 25 to 60 per cent. In a short series of sixteen cases of diabetes with carbuncle, treatment in ten was by intravenous injections of methenamine and of the patients concerned one, who had received methenamine inadequately and very late, died. The other six patients received no methenamine; three of them were treated by radical incision of the carbuncle, and of these, two died. The rationale of the use of methenamine for this purpose is given.

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SPONTANEOUS HYPOGLYCEMIA

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EXTENSIVE work in the field of endocrinology during the last decade has resulted in the establishment of many new disease entities. There is probably no new entity more dramatic in its symptoms than that of spontaneous hyperinsulinism.

The close association of hyperinsulinism with its counter disease diabetes mellitus or hypoinsulinism makes it necessary to include both diseases in any historical résumé of this condition.

Diabetes mellitus was probably known to the ancients, as is evidenced by their description of polyuria in the Papyrus Ebers.²⁷ The first accurate description of diabetes, however, was given by Areteus the Cappadocian¹ sometime during the second century. Many other authors observed diabetes, but the first notable contribution to the disease came in 1679 when Thomas Willis⁴³ recognized that the urine of diabetic individuals was sweet in taste. From the time of Willis there was no increase in the knowledge of diabetes until Matthew Dobson⁹ by a series of well planned experiments proved that sugar was present in the diabetic urine. Again, with the exception of minor contributions, nothing of importance was noted until the time of Oscar Min-

kowski. It was to be the lot of this observer to recognize that diabetes mellitus could be produced by the extirpation of the pancreas.²⁹ Then Opie, while working at Johns Hopkins University, called attention to the degenerative changes in the Islands of Langerhans of the diabetic pancreas.³¹ The summation of the work of Opie and Minkowski led Sharpey-Schafer in 1916 to advance the hypothesis that some unknown substance of the islet cells was missing in diabetes mellitus. There was now left for the physiologist the problem of isolating this unknown substance. Moses Barron⁴ noted that in obstruction to the pancreatic ducts there was no atrophy of the islet cells; and it was Banting who first realized the significance of this observation. Upon this observation Banting first built the method of isolating insulin. In 1922 Banting and Best³ not only established the existence of insulin in the islet cells, but were also able to show its practical application in the treatment of diabetes mellitus. Thus was established the accuracy of Sharpey-Schafer's original hypothesis. Since this work was completed, diabetes mellitus may well be known as "hypoinsulinism." Events moved rapidly following the discovery of insulin and soon physicians became familiar with hypogly-

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cemic shock from overdosage of insulin. It remained, however, for the astute clinical observer Harris¹⁷ to recognize that hypoglycemic reactions occurred in individuals not receiving insulin, and he suggested that this phenomenon might well be pancreatic in origin. The pathological proof of this suggestion was wanting until Wilder⁴⁰ and his associates by a most brilliant clinical and physiological observation definitely established the existence of pancreatic hyperinsulinism.

Since the report of Harris and Wilder, an increasing number of cases of spontaneous hyperinsulinism are appearing in literature; and today the disease is being recognized universally. It is the purpose of this paper to emphasize that in spontaneous hyperinsulinism other factors play as important a rôle in the production of this disease as does the pancreas itself.

Many names have been suggested for this new entity, the commonest of these being: spontaneous hyperinsulinism, spontaneous hypoglycemia, insulogenic hypoglycemia, pancreatic hypoglycemia, etc. No name so far suggested accurately describes the disease in toto.

Any definition of this disease must by necessity be lengthy and inclusive. It may be well defined as a specific disease characterized by vague attacks of neurological bearing that vary from mild sensations of uneasiness to grand mal seizures or even narcolepsy, with relief from these attacks occurring upon the administration of carbohydrate, the diagnosis clinically depending on a low blood sugar during the attacks, and caused anatomically by tumors or hypertrophy of the Islands of Langerhans; or other endocrine disorders.

Very little information exists concerning the influence of season, climate, altitude, etc., upon this disease. The ages of those suffering from the disease vary greatly, and there is no clinical or pathological evidence from the reports to suggest that this disease may be limited to any specific age group. The cases reported so far are too few in number to state the sex relationship, but to date it appears as though the disease occurs twice as frequently in men as in women. The disease has no predilection for specific occupations, nor is it associated with any hygienic factor.

Toxic factors, particularly those that produce liver damage, will precipitate and even be the etiological factors in producing spontaneous hy-

poglycemia. Evidence is accumulating that chronic alcoholism, cirrhosis of the liver, etc., may decrease the heptogenic glycogen storage function to such an extent as to produce hypoglycemia. Bizarre types of diet, particularly when they include excessive amounts of carbohydrate, may lead to hypoglycemic reactions. Diabetes also plays a role in the production of spontaneous hypoglycemia. This phenomenon is being looked upon as a dysinsulogenic process and will not be discussed in this paper. Trauma and infection play a role in the excitation of attacks as, also, do mental strain and worry.

The symptomatology of this disease is protean yet retains a number of basic phenomena that aid in the establishment of a diagnosis. In general the attacks resembles the insulin shock produced by an excessive dosage of insulin. The attacks are relieved by the ingestion of food. At the onset the attacks are mild in character and occur at wide intervals. As the disease remains untreated the attacks become increasingly severe and intervals shorter.

The attacks usually occur at varying intervals following meals or after fasting. At the onset, the patient becomes weak and nervous, the hands tremble and a sensation of hunger may appear. Almost by instinct the patient realizes that food will relieve the attack.

Occasionally visual disturbances appear with blurred vision and diplopia being common complaints. Nausea, vomiting and vertigo are frequently reported. Neurological complaints are present, particularly those suggesting epilepsy. In severe attacks the mental confusion becomes pronounced with the patient passing into mild states of stupor or into complete narcolepsy. Convulsions may be pronounced. The seizure seldom lasts long, except terminally, and the patient usually recovers spontaneously from the attack. Following the attack the patient may reveal a loss of memory for events that occurred during the interval of seizure. Sometimes residual neurological symptoms are present following the attack. In severe seizures the patient may have the sensation of dissolution. Often the presenting symptoms are strongly suggestive of epilepsy except that the attack is aborted by the administration of carbohydrate. When untreated, the disease usually increases in severity.

Physical examination during the intervals reveals no pathognomic sign of the disease. When

seen in the attack, the picture resembles either an insulin reaction or one of the epileptiform states.

The diagnosis is usually made by the presence of low blood sugar values. This is particularly true of fasting examinations. Blood sugar determinations taken every two hours while the patient is on his regular diet frequently reveal subnormal blood sugar values occurring at the time of seizure. Blood sugar determinations taken during the attack reveal low values. Occasionally the spinal fluid may have a low sugar value. Glucose tolerance curves give many types of reaction, but as yet their complete diagnostic significance is unknown. Other laboratory findings may be normal or reveal conditions of little significance. There may be, however, findings suggesting endocrine disturbance such as low basal rates, etc., that are of value in determining the etiology of the attacks.

An intelligent understanding of the disease necessitates a knowledge of carbohydrate metabolism as well as the realization that in spontaneous hyperinsulinism the disease is not necessarily pancreatic in origin but rather may be the expression of some other endocrine disturbance.

In general, the available carbohydrate to the body represents the ingested carbohydrate plus the carbohydrate moiety of the proteins as well as the carbohydrate component of fats. The carbohydrates are, in the most part, converted into glucose by the action of enzymes. The glucose thus formed is absorbed and carried to the liver by the portal circulation. The small amounts of galactose and levulose that are formed are also converted into dextrose (glucose) as an end-result of digestion. Likewise the available carbohydrates from the amino acids and fats are converted into dextrose.

When the glucose reaches the liver, it may be converted into glycogen by the action of specific enzymes, and this glycogen is stored in the liver. This process is known as glycogenesis. The liver is able to store approximately two hundred grams of glycogen, and it is this glycogen that represents the available source of carbohydrate reserve for the maintenance of the blood sugar. By the process of glycolysis small amounts of glucose are used in hepatic cell metabolism. Any excess of glucose passes directly into the general circulation where, by the process of glycogenesis or glycolysis, it is stored or utilized by the tissues.

The glycogen stored in the muscles represents the glucose requirement for tissue metabolism. The glucose used by the tissues differs from glucose of hepatic origin. It is necessary that the hepatic glucose again undergo the process of tissue glycogenesis. This phenomenon is probably influenced by insulin activity. The hepatic glycogen maintains the blood sugar level and is called upon to furnish glucose to the tissues upon depletion of the tissue glycogen reserve.

In general, the tissue glycogen concentration is depleted in proportion to the amount of tissue metabolic activity, and its restoration to normal depends upon the hepatic glycogen reserve. However, insulin is necessary for tissue glycogenesis and any factor altering the secretion or activity of insulin also indirectly alters the process of glycogenesis. Pituitrin is antagonistic to insulin in its action and is known to inhibit tissue glycogenesis.⁵ Wilder⁴¹ described a new syndrome of pituitary hypoglycemia which is characterized by hypoglycemic symptoms in association with pituitary disturbances. He also mentions several patients afflicted with pituitary tumors who in addition suffered from hypoglycemia. Lloyd²⁴ observed a patient with proven pituitary tumor who died in convulsions. Necropsy revealed, besides the tumor, hypertrophy of the Islands of Langerhans and of the parathyroids.

The hepatic glycogen reserve maintains the normal blood sugar concentration and any change in the hepatic glycogen reserve is dependent upon many extrahepatic factors. Hepatic glycogenolysis is increased when there is a fall in the blood sugar concentration, this mechanism being of a compensatory nature. Adrenalin influences the hepatic glycogen content in various ways: it causes a decrease in tissue glycogen content and inhibits glucose oxidation; in addition it increases all glycogenolytic processes with a resultant increase in blood sugar concentrations. Anderson² reports a case of fatal hypoglycemia in a patient dying of an adrenal tumor, while Longcope²⁵ was able to find hypoglycemia frequently in scleroderma. Further, Wadi³⁸ refers to the presence of hypoglycemia in Addison's disease.

Thyroxin in increased amounts makes the liver sensitive to nervous impulses and to adrenalin, which increases the rate of glycogen change into glucose. It is upon this basis that the fasting hyperglycemia of hyperthyroid individuals is best explained. In thyroid insufficiency the subject

of hypoglycemia is one of controversy. It has been observed by Sharpey-Schafer,³⁴ Campbell,⁶ as well as Gardner-Hill, et al.,¹⁴ that patients with myxedema, cretinism and other hypothyroid states have an increased carbohydrate tolerance as well as hypoglycemia in some instances. Apparently the degree of hypoglycemia under these circumstances is not marked and of little clinical importance.

An increased hydrogen ion concentration brings about an increase in the glycogenolytic action with a hyperglycemia resulting because of it. Such is the nature of the hyperglycemia occurring with asphyxia.

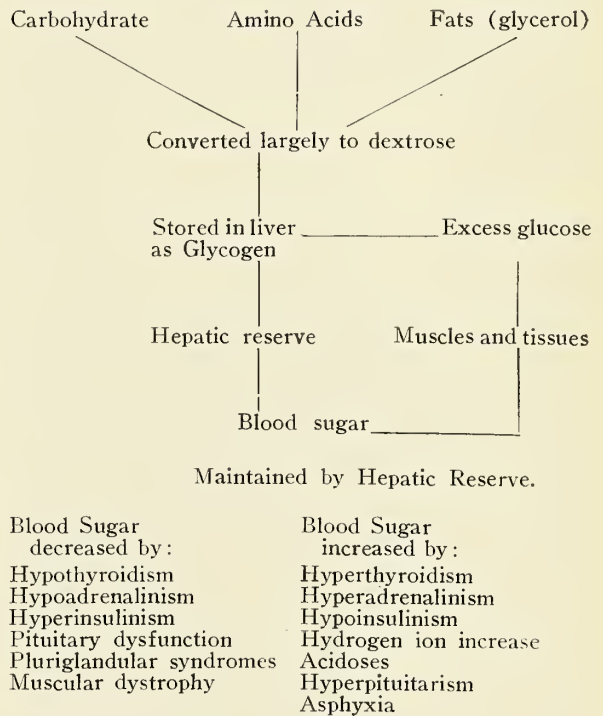
Puncture or stimulation of the floor of the fourth ventricle sends nerve impulses to the liver and adrenals. These impulses by increasing the amount of adrenalin as well as by stimulation of the liver increase the blood sugar concentration. Severe or strenuous muscular activity produces a rise in blood sugar values largely through the influence of adrenalin. This in turn may be followed by a compensatory hypoglycemia. It is interesting to note that Scheimann³³ found two cases of hypoglycemia in progressive muscular dystrophy.

Inasmuch as the hepatic glycogen content varies with changes in the tissue glycogen content, it becomes apparent that any factor decreasing the utilization of tissue glucose will also alter the hepatic reserve and produce hyperglycemia. In diabetes, insulin is deficient, and since insulin is necessary for tissue glycogenesis it is obvious that hyperglycemia must result. Further, since pituitrin is the antagonist of insulin, it follows that patients suffering from hyperpituitary states will show evidence of hyperglycemia.

Hypoglycemia may result from a decreased rate of hepatic glycogenesis or by increased tissue glycogenesis or tissue glucose utilization. It is known that hypothyroidism and hypoadrenalinism are often associated with low blood sugar values. Since the liver acts as the reserve medium for glycogen, any factor that alters liver function, thus diminishing or preventing hepatic efficiency, will produce hypoglycemia. Late stages of hepatic cirrhosis often show low blood sugar values. Diabetics will at times show hypoglycemia because of a sudden depletion of the hepatic reserve. Occasionally patients suffering from diabetes and cirrhosis of the liver will show an increased carbohydrate tolerance as the cir-

rhotic process becomes severe. Toxic factors producing liver damage may also deplete the hepatic reserve. Mann²⁸ has established the relationship of the liver to glucose storage. Le Count, et al.,²³ feel that the glycogen storing capacity of the liver may be impaired in alcoholics because of fatty infiltration. They also suggest that "whiskey fits" may be due to hypoglycemia. Nadler and Wolfer³⁰ report hypoglycemia in a patient dying of carcinoma of the liver, while Josephs,²¹ Griffith,¹⁶ Snapper and Van Creveld,³⁶ as well as Wagner and Parnass³⁹ found hypoglycemia in association with various hepatic changes. Elliot¹¹ reports the presence of hypoglycemia in primary carcinoma of the liver.

CHART I. SOURCE OF CARBOHYDRATE



Changes in tissue glycogenesis may result from spontaneous increase in insulin secretion. In certain tumors having their origin in the islet cells of the pancreas there is an increase in insulin formation with resulting hypoglycemia.^{31,32,33,34} There is also a spontaneous increased insulin secretion from apparently normal islet cells that also lowers the blood sugar concentration.^{12,42} A compensatory hyperglycemia often follows intermittent hyperglycemia phenomena. This is seen in excessive carbohydrate

ingestion or increased adrenal secretion; following the primary rise in the blood sugar an overstimulation of the islet cells results in an excessive insulin formation producing a compensatory hypoglycemia. John¹⁹ was the first to suggest the overfunction of the insulogenic apparatus to increased carbohydrate intake; and Winons⁴⁴ suggests that an excessive carbohydrate intake was an important factor in one of his cases of hyperinsulinism.

In hypopituitarism, there is a disturbance in the pituitrin-insulin balance that results in a hypoglycemic state.^{24,41}

It is obvious that hypoglycemia may result from numerous factors other than the primary pancreatic factor. The success in therapy depends on the recognition of the cause of the hypoglycemia. Chart I outlines briefly the factors influencing carbohydrate metabolism.

The following three cases are illustrative of the various etiological factors producing hypoglycemia.

Case Reports

Case 1.—W. F., a white male pharmacist, twenty-nine years of age, came under observation on October 7, 1932, because of an "impelling desire to sleep."

In June of 1932 he developed an upper respiratory infection that persisted for two weeks. He recovered his health, but noticed that any exertion would bring about a feeling of exhaustion. In August he noticed that this feeling of exhaustion was now present at the time of awaking from sleep and would then recur in the middle of the morning. This feeling was aborted by taking a nap of ten to fifteen minutes. In the latter part of August the feeling of fatigue and faintness began to occur just before meals and the sensations would disappear as soon as he ate food. During September the feeling of weakness and fatigue became marked two to three hours after meals and he also noticed that he was running an elevated temperature usually in the neighborhood of 99 to 99.2 degrees Fahrenheit. During the last week of September the attacks assumed a new form and were more severe. The new seizure was in the nature of a desire to sleep. This became progressively worse until he would fall asleep even while working. The patient discovered that if he ate, the desire to sleep was much less than when he went without food. Because of these uncontrollable attacks of narcosis the patient lost his position.

Physical examination revealed no evidence of disease. Complete roentgenological examination gave no evidence of any infection producing the slight elevation of temperature. His blood pressure was 126 systolic and 82 diastolic. Sedimentation rates were only moderately increased in speed but sufficiently so to indicate the presence of an infectious process. Urine ex-

amination was negative. Blood studies yielded a hemoglobin of 66 per cent, red blood count of 3,900,000, and a white count of 6,300. Urea nitrogen and creatinin were within normal limits. A fasting blood sugar showed 59 mg. per 100 c.c. of blood. The blood Wassermann was negative.

A diagnosis was made of: (1) Narcolepsy secondary to hypoglycemia, probably due to spontaneous hyperinsulinism; (2) Secondary anemia; (3) Hyperpyrexia of unknown origin.

The patient was then permitted to eat his regular diet and blood sugar determinations were made at various intervals during the day. The results were as follows:

Hour	Calorie Intake	Blood Sugar (mg.)
8:00 a.m.	800	
8:30 a.m.		102
10:30 a.m.		69
12:00 noon	800	
1:00 p.m.		76
3:00 p.m.		58
5:00 p.m.	1000	
6:00 p.m.		75
8:00 p.m.		76

The onset of the attack was aborted at 10:30 a.m. and again at 3 p.m. by the ingestion of a candy bar.

The patient was placed on a diet consisting of 4,600 calories with the feedings divided into two hour intervals during the day. The last meal was eaten at midnight. The attacks of narcolepsy stopped immediately. He was given iron and arsenic for the secondary anemia. His temperature remained elevated for six weeks. At the end of eight weeks his hemoglobin was 86 per cent, red blood count was 4,200,000, and the white count 6,800. The patient was then placed upon his regular diet and instructed to return to the high caloric diet if symptoms returned. Since January, 1933, the patient has followed no special diet and has been free of attacks. Apparently in this instance the presence of a nontuberculous infection played an etiological role in producing the hypoglycemia. This individual represents a case of narcolepsy secondary to hypoglycemia of probable hyperinsulinic origin which was aggravated by an infectious process.

Case 2.—The second patient was thirty-seven years of age and a machinist by occupation. He came under observation in December, 1932, complaining of having "dizzy spells and lapses of memory."

In November, 1931, the patient first noticed that at 8:00 p. m. daily he would be seized with a feeling of "light headedness" and a sensation of "floating in the air." He would be conscious of people about him, but was disorientated as to place and time. Often following such an attack he would find himself some distance from the place at which the attack started. At times he was unable to remember events that occurred during the seizure. The attacks lasted about fifteen minutes and would leave him exhausted. A previous diagnosis of petit mal had been made elsewhere.

Physical examination was interesting in that the

patient's habitus was definitely of the hypopituitary type. The testes were small, although libido was present to a moderate degree. His voice was of high timbre, and the distribution of fat was typically pituitary in type. The breasts were not excessively enlarged. He stated that he always had had a peculiar build. He was forty-two pounds overweight.

Laboratory examinations gave the following results: B. M. R. minus 5; hemoglobin 86 per cent; red blood count 4,600,000; white blood count 9,000; blood Wassermann negative; blood sugar 120 mg. per 100 c.c.

A tentative diagnosis was made of: (1) petit mal or epileptic equivalent; (2) Froelich's syndrome (moderate severity).

The patient was placed on sodium bromide 45 grains daily. There was a slight improvement in his condition; the attacks still occurred but were not as severe. Then one evening I was fortunate in seeing the patient in a particularly severe attack, and he presented the classical picture of hypoglycemic shock. The attack was aborted immediately by orange juice and sugar. A second blood sugar revealed on fasting 126 mg. per 100 c.c. of blood. The attack, however, was so characteristic of hypoglycemic shock that extra feedings were advised and resulted in making the patient worse. It was now felt that the patient probably had a carbohydrate intolerance because of his hypopituitarism and that the sodium bromide had aided in relieving his attack by inhibiting the action of the insulin. On re-examining the patient I was startled to obtain the following additional history. Six months previous to the onset of this illness the patient felt he had to eat more food because of the "heavy nature of his work." He voluntarily placed himself upon a diet of two pounds of candy and three or four malted milks daily in addition to his regular diet. On checking his caloric intake it was discovered that he was ingesting some 6,000 to 8,000 calories daily. The greater part of this food was carbohydrate. He was removed from this diet and placed upon one containing approximately 3,000 calories, and as soon as he started this diet his attacks stopped. He can develop the attacks by increasing this caloric intake to the old amount. He lost twenty-two pounds in weight on his new diet.

This patient then represented a case of carbohydrate intolerance probably due to his hypopituitary state. The excessive amount of carbohydrate ingested in all probability resulted in an increased insulin secretion with a compensatory hypoglycemia following the initial hyperglycemia. The final diagnosis was: (1) petit mal seizures secondary to hypoglycemia of compensatory hyperinsulinic origin; (2) Froelich's syndrome; (3) obesity.

Case 3.—The third case is that of a thirty-six year old electrician, who came in for examination on January 4, 1933, because of "epilepsy."

He had enjoyed good health until 1931, when he noticed that he was developing peculiar "spells." These spells occurred on working days but rarely on Sundays and holidays, and they made their appearance at 10:00 a. m. and 3:00 p. m. The attack consisted of a feeling of weakness and generalized numbness. At the onset

he had a complete lapse of memory for events occurring during the attack. The attacks disappeared spontaneously, leaving the patient weak and exhausted. By accident he discovered that the eating of food would abolish the attacks. He consulted a physician in 1931 who told him he was suffering from epilepsy. He recalled that about the time the disease manifested itself he was not receiving proper food and he had gone without meals on many occasions. The attacks were of moderate severity until December, 1932, when they became more frequent. They were now occurring at 1:00 a. m., 10:00 a. m. and 3:00 p. m. The attacks were more severe and he now had the sensation of dissolution. Food and violent physical exercise would abort the seizure.

Physical examination was completely negative.

Laboratory findings were normal except for a fasting blood sugar of 60 mg. per 100 c.c.

On a 2,400 calorie diet the blood sugars at two hour intervals revealed the following values:

Hour	Calorie Intake	Blood Sugar (mg.)
8:00 a.m.	800	
8:30 a.m.		77
10:30 a. m.		69
12:00 noon	800	
1:00 p. m.		110
3:00 p. m.		70
5:00 p. m.	800	
6:00 p. m.		92

The total caloric intake was increased to 4,200 calories and the feedings were divided into two hour intervals. The last feeding took place at 11:00 p. m.

The patient developed no further attacks until March, 1933. At this time he developed a severe upper respiratory infection, and the attacks again made their appearance, occurring six or seven times daily. These were aborted by increasing the number of feedings. The patient remained free from attacks while he remained on his diet.

A final diagnosis was made of spontaneous hyperinsulinism, probably of primary pancreatic origin.

The past few years have seen a great increase in our knowledge concerning the pathology of this disease. In general, those cases reported in which operation or necropsy have been performed may be divided into: (1) those revealing a normal organ; (2) those revealing tumors of the pancreas, either benign or malignant; and (3) those revealing hypertrophic island changes. Wilder⁴² furnishes the information that in twenty-nine available cases the island cells were normal in nine instances. It is of course perfectly feasible that, even in the absence of histologic evidence of disease, these cells were, by some inherent dysphysiological factor, able to secrete excessive

amounts of insulin. Nor must it be forgotten that in these instances the hypoglycemia may not have been primarily insulogenic, but rather the result of some other endocrine influence.

Smith,³⁵ in a recent study of pancreatic tumors, emphasizes the existence of pancreatic adenomas of islet cell origin without any evidence of hypoglycemia. She also concludes that those tumors producing hypoglycemia are in the greater part composed of beta cells. But there is rapidly accumulating evidence to indicate that adenomas of islet cell origin can and do produce hypoglycemic symptoms and that these symptoms are relieved by surgical excision.^{7, 8, 18, 26}

In the severe types of hypoglycemia with associated weight loss and irretractable clinical symptoms, adenocarcinoma of the islands of Langerhans have been found. Occasionally there is difficulty in ascertaining the malignancy of these tumors. Wilder has been able to review sixteen island cell tumors since his original description of carcinoma of the island cells. Preoperative diagnoses were made in nine cases and tumors were found at operation.⁴²

Hypoglycemia has been found associated with hypertrophy of the islet cells, and at times hypertrophied cells will be found in the region of the adenoma.²⁶ Phillips²⁰ and Jolin³² report hypoglycemia in association with hypertrophied islands. Gray and Feemster,¹⁵ as well as Dubreuil,¹⁰ have reported hypertrophy of the island cells in children of diabetic mothers.

The summation of the pathological evidence to date suggests that hypoglycemia may result from: (a) normal islet cells; (b) islet cell adenomas which may be benign or malignant; and (c) hypertrophied islet cells. A classification, however, entirely based upon pathology is wanting in completeness and the following classification of Gammon and Tenery¹³ is suggested:

Endocrine Hypoglycemia

Pancreatic

A. Hyperfunction or hyperinsulinism, diffuse hypertrophy and tumors of the islets; dysinsulinism or dysinsulinosis

B. Late diabetes

C. Alimentary hypoglycemia

Suprarenal insufficiency

Pituitary dysfunction

Thyroid insufficiency

Pluriglandular syndromes

Other Types of Hypoglycemia

Hepatic

Muscular dystrophy

Renal diabetes

Lactation and pregnancy

Fatigue

Infections

Terminal hypoglycemia

The treatment of spontaneous hyperinsulinism offers two alternatives: either medical or surgical. It is understood that the intelligent treatment of the disease is dependent upon the discovery of the etiological factor. The problem resolves itself into either furnishing sufficient carbohydrate to balance the excess of insulin or else to decrease the secretion of insulin by operative removal of part of the pancreas. It is preferable to treat the patient by a dietary régime which will insure him sufficient glucose to prevent attacks. The diet should not only be increased in caloric value, but should contain a low carbohydrate and high fat ratio. By decreasing the carbohydrate intake we may be able to prevent a resultant hypoglycemia. If under dietary management the patient shows no improvement but even becomes worse, we must consider the possibility of surgical exploration. A constant down-hill course suggests the possibility of an adenoma of the islet cells. The surgical removal of adenomas has proven successful, but it is extremely difficult to make this diagnosis unless the patient has been under observation for a long period of time. The continued progress of symptoms under medical management in the presence of a developing cachexia leads us to suspect that malignant changes have occurred in the islet cells.

Because of the lack of sufficiently satisfactory surgical results, exploration is only advisable when dietary régimes have failed. On exploration the pancreas may be normal in appearance, but surgical excision of part of the pancreas is warranted in an attempt to remove part of the island cells. As yet this procedure is wanting in good results, possibly because our lack of knowledge concerning the amount of pancreatic tissue to be removed. The surgical removal of island cell adenomas offers excellent results and a favorable prognosis. Judd and his associates give an excellent review of the surgery of hyperinsulinism in a recent publication.²² The surgical treatment otherwise is still uncertain and should

only be used when the medical treatment has failed.

Conclusions

1. Three cases of spontaneous hypoglycemia are reported, one due to infection, the second to excessive carbohydrate ingestion with hypopituitarism, and the third to spontaneous hyperinsulinism.

2. It is emphasized that other factors than the pancreas may be of great etiological importance in producing hypoglycemia.

3. The success in therapy is dependent upon the diagnosis of the etiologic factor, and surgical exploration is indicated upon the failure of medical treatment.

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THE LABORATORY TECHNICIAN*

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IN the early days of the clinical laboratory, not so many years ago, it was not uncommon to see a physician perform the function now generally performed by lay workers. In those days, methods universally employed were comparatively few and simple. With rapid advance in diagnostic procedures in recent years, the exactitude of technic and often the complexity of methods employed, as well as the time-consuming technical detail, have come to demand specially trained workers to devote their full time in the clinical laboratory while the physician may devote himself to general supervision, interpretation of findings and consultation. To-day, it is generally accepted that the purely technical or mechanical part of this work may be vested, wisely, in the hands of trained non-medical assistants whose duty it shall be to devote their skill and energy in the performance of the various technical methods demanded of the laboratory. Thus, the laboratory technician has come into being in modern medical practice.

Largely through the insistence of the American Medical Association and the American College of Surgeons that adequate laboratory facilities be available in every hospital of good stand-

ing and because of the increasingly important rôle properly rendered laboratory reports play in clinical diagnosis, the service of the laboratory technician has become as indispensable and important as any single auxiliary agency employed in the field of medical practice.

It may be roughly estimated that there are, to-day, between 15,000 and 20,000 laboratory assistants, commonly designated as laboratory technicians, throughout the United States. Many of them are out of employment due to the present economic situation. In addition, approximately 1,000 technicians are being "graduated" annually who are eager to begin their careers as full fledged laboratory technicians. A large majority of them have come into the ranks within the past decade. Among them are many college graduates who either finished a regular university course in medical technology or went into this field after a period of preparatory training or as special workers (such as chemist or bacteriologist, etc.). There are many others with the necessary educational background who received adequate training in a recognized hospital laboratory and became qualified technicians. A large number of these laboratory technicians, however, obtained their training and experience under conditions which have been considered en-

*From the Pathological Laboratory of the Charles T. Miller Hospital, Inc., Saint Paul.

tirely unsatisfactory from a technical standpoint and on ethical grounds. Many of them completed a period of apprenticeship ranging from a few weeks to six months, perhaps in a poorly supervised clinical laboratory where they were engaged as the technician's voluntary helpers for the privilege of "picking up" a few clinical laboratory methods. Many others are so-called "graduates" of the commercial schools for laboratory technicians where they received a course of instruction which, on the whole, has not been found adequate in the making of qualified technicians. A commercial school for technicians has been known to represent an enterprise of unscrupulous promoters who show little regard for professional or business ethics and who are in it purely for their own self-interest.

It is, thus, evident that there actually exists deplorable confusion in the present system of training of laboratory technicians. In a recent survey,⁵ out of the 130 hospital laboratories which conduct a technicians' course, twenty-two (16.9 per cent) required college graduation for entrance; nineteen (14.6 per cent) two year college work; forty-three (33.0 per cent) one year college work; and forty-six (35.3 per cent) high school graduation. The length of the course also varied, regardless of the preliminary education, from less than six months, of which there were four, to three years. Seventy-nine (60.0 per cent) required a period of twelve months for the training and twenty-five (19 per cent) less than twelve months. The method of instruction is also by no means uniform. Many of them simply offer the opportunity of purely practical or apprenticeship training without any planned teaching or didactic instruction. A few follow an organized plan of instruction, including minimum hours of didactic teaching. Very few actually carry on regular lecture hours. While these figures and data show a substantial gain over those of two years ago obtained in a similar survey,³ they indicate definitely a continued lack of uniform standards in the whole program of instruction and training given in these hospital laboratories. When it is realized that the survey did not include the commercial schools, private laboratories and probably many of the hospital laboratories which operate a technicians' course of questionable standing, the problem becomes even greater and more complicated.

The chaotic situation is characteristic of any pioneer movement and undoubtedly subject to

gradual evolution and improvement. The first remedial step appears to be a campaign to disseminate information on the present situation among the physicians and to urge the universal acceptance of a minimum standard whereby the qualifications of laboratory technician may be clearly defined as to her preliminary education, practical training and subsequent experience.

The American Society of Clinical Pathologists, composed as it is of physicians primarily interested in laboratory medicine, early took cognizance of the situation and established, in 1928, a Board of Registry of Laboratory Technicians to inaugurate an organized attempt to standardize the qualifications of laboratory technicians and promote the minimum essentials for approval of training schools. The registration of laboratory technicians who possess the necessary minimum qualifications, consisting of one year college credits, including chemistry and biology, or the equivalent, in preliminary education, and not less than twelve months of systematic practical training and experience under a recognized pathologist, soon became a principal function of the Board. The registration of schools for laboratory technicians which meet the essentials for approval has also been undertaken. To date, the Board has issued more than 2,200 certificates of registration to the laboratory technicians who met the requirements. In June, 1933, the Board inaugurated a semi-annual examination of candidates applying for registration. This was done to eliminate those who are deficient in preliminary education, technical training and practical experience, through the medium of written and practical examination and personal interview. The Board accepts only those educational credits and recognizes such instruction and training as are obtained in the institutions which are recognized by the American Society of Clinical Pathologists or the American Medical Association. The Board of Registry has also issued some forty certificates of registration to those universities, colleges and hospital laboratories, which, upon application, were found to conduct an approved course of training according to the minimum requirements.¹

The program of the Board of Registry has received, from its very inception, the unqualified endorsement and support of both the American Medical Association and American College of

Surgeons, whose representatives have lent their sympathetic coöperation at all times.

Under the date of July 20, 1934, Dr. Malcolm T. MacEachern, Director of Hospital Activities of the American College of Surgeons, wrote to the writer as follows:⁴

"We have not yet made it a requirement that all laboratory technicians be registered. We are urging them to register and, to all intents and purposes, our recommendations may be and are being interpreted as a requirement. In the next two or three years this will virtually be a requirement as it is now to have medical supervision over the laboratory."

The statement is of utmost significance not only to hospitals and technicians but to the practice of medicine, at least, as it is carried on in the hospital.

Regarding the status of the training schools for laboratory technicians, the Board of Registry is now working in close coöperation with the Council on Medical Education and Hospitals of the American Medical Association, whose field inspectors have been conducting investigation of these schools, of which there are more than two hundred throughout the United States. As soon as this inspection is completed, new essentials for approval of these schools will be formulated, jointly by the Council and the Board. The approval of the schools for training of laboratory technicians will then be granted jointly by these two bodies. A model curriculum is being prepared by the Board at this time and will be published as a guide for the schools for technicians.

The Board of Registry is solicitous of enlisting more of the colleges and universities of recognized standing to establish a regular course in medical technology either on a four year basis leading to a degree or on a two year plan leading to a certificate. Perhaps, not more than twelve colleges and universities offer such a course at the present time, which is wholly inadequate to meet the normal demand. The Board, on the other hand, is firmly of the opinion that it would be highly detrimental to the interest of medical practice in general and to laboratory medicine in particular, to countenance any attempt to instruct unqualified individuals or to conduct a course of instruction which does not meet the essential requirements.

The essential qualifications of a laboratory technician may be briefly defined as follows:

1. Preliminary education of four years' high school work and one year college credits, including chemistry

and biology or kindred sciences. This is to be increased to two years of college work, including major sciences beginning 1936.

2. Training in an approved clinical laboratory of not less than twelve months.

3. Strict adherence to the code of ethics as defined by the Board. This provides that "all registered technicians shall agree to work under the supervision of a qualified physician and under no circumstances shall they, on their own initiative, render written or oral diagnoses, except in so far as it is self evident in the report, or advise physicians and others in the treatment of disease or operate a clinical laboratory independently without the supervision of a qualified physician or clinical pathologist."²

At first glance, these provisions may seem too drastic. However, in view of the increasingly important part the laboratory technician has come to play in medical diagnosis and because of the present tendency of commercially inclined individuals and institutions to maintain a short course of instruction wholly inadequate to meet the responsibilities of a qualified laboratory technician, there is ample justification in demanding that her general intellectual requirements and technical qualifications be elevated, so that the field may not be overcrowded by those of questionable training and experience, and that her activities be strictly defined under all conditions.

The Board of Registry is a voluntary agency under the control of the American Society of Clinical Pathologists. It has no legal authority. It merely serves as an intermediary between the medical profession and laboratory service. It possesses no compulsory power to force technicians to register or to follow its rules and regulations. The Board believes that its guiding principles are sound and for the betterment of the practice of laboratory medicine. It is entitled to the support and coöperation of the medical profession.

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THE ACCESSORY SCAPHOID*

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IN October, 1929, Dr. Frederick Kidner of Detroit, Michigan, reported an operation for flat feet in which the accessory scaphoid was present. He calls it the pre-hallux, on the theory that it is a direct descendant of the sixth toe. It is an extra bone occurring in some feet just internal to or somewhat behind and below the scaphoid. There may be a true joint with cartilage and ligaments between it and the scaphoid or it may be practically fused to the scaphoid. The tibialis posticus tendon attaches to it, nearly enveloping it as it passes on to the under-surface of the cuneiforms and metatarsals. The path of the tendon therefore lies more mesial and dorsal than when it passes beneath the plantar surface of the scaphoid when the accessory scaphoid is absent. Kidner deduces from this condition that the tibialis anticus works at a mechanical disadvantage in this position: that instead of lifting the tarsus directly upward, the tendon is required to pull inward and backward and then upward, so that it pulls at an angle or around a curve instead of in a straight line, and in so doing has to pull through a longer distance, which in turn requires a greater muscular contraction. It was also noted that, as the foot was inverted, the soft tissues were crowded between the accessory scaphoid and the internal malleolus. These conditions result in the typical everted or flat foot, so often seen in company with the accessory scaphoid of any size.

I have recently operated on twelve patients with accessory scaphoids with uniformly good results. All of these patients had marked pronation and all complained of tenderness over the accessory scaphoid. The efficiency of the foot was markedly impaired and complaints varied from inability to engage in athletics to fatigue on walking even a few blocks. The shoes were generally out of shape and in ten cases the scaphoid area was swollen and red, and three patients had developed callus over the bony prominence of the accessory scaphoid. Active supination was definitely limited. Eight patients had tried other treatment, including Thomas heels,

one-quarter inch lifts, arch shoes, Whitman arches, and exercises, with partial relief in four cases, but no marked improvement in any.

The operation used was similar to the one Kidner advised. A curved incision was made along the tibialis posticus tendon with the accessory scaphoid as its mid-point. The tendon was exposed and freed above and below the accessory scaphoid. It was then freed from the accessory scaphoid by removing with an osteotome a thin layer of the accessory scaphoid, which remained attached to the tendon. Then the accessory scaphoid was removed and, if the inner edge of the scaphoid was still prominent, a piece of it was removed from its inner and under surface. Dissection was then continued laterally under the scaphoid. A deep chromic stitch then sutured the tendon to the plantar fascia in such a way that the tendon lay under the scaphoid and the raw surface of the thin layer of bone on the tendon faced the denuded surface on the plantar side of the scaphoid. During this fixation the foot was held in supination. After fixation, it was noted that the foot remained in supination. The wound was closed and plaster applied with the foot in supination. Casts remained on for six weeks; during the last two weeks the patients walked on the casts. After removal of casts the heels of the shoes were raised on the inner edge. Whitman arches were used in four cases. Corrective exercises were given. The oldest case is now one year old, post-operatively; the youngest, five months. All patients are markedly improved in foot position, none having more than slight pronation. All report entire absence of pain or discomfort. All are more active than before. Three are not limiting their activity at all, even engaging in athletics. All can actively supinate, even when the weight is borne on one foot.

A more recent article by Dr. Kidner reports his continued success with this operation and, in addition, describes the use of the same operation in cases of flat feet without the accessory scaphoid, where the posterior tibialis tendon passes across the inner side of the scaphoid instead of under it.

*Read before the Clinical Orthopedic Society, Rochester, Minnesota, November, 1933.

THE DOCTORS MAYO CITED BY THE AMERICAN LEGION IN THE PRESENCE OF PRESIDENT ROOSEVELT

For nearly twenty-four hours, including the evening of August 7 and until mid-afternoon of August 8, Rochester was given over to the single purpose of honoring Drs. William J. Mayo and Charles H. Mayo. National Commander of the American Legion, Edward A. Hayes, presented a citation authorized by the national executive committee of the Legion, and the President of the United States, Franklin D. Roosevelt, in person, presented to the brothers a bronze plaque, the gift of the William T. McCoy Post of the Legion.

Ceremonies of Tuesday

On August 7, preceding the president's arrival, a dinner was held at the Kahler hotel. This was attended by about 300 leaders of the medical profession, of the American Legion, of the State of Minnesota, and of the City of Rochester. Guests were welcomed by Mayor Reiter of Rochester.

Following the dinner, the guests adjourned to Soldier Field, the 160-acre municipal playground first purchased and developed by the local post of the Legion. There the guests mounted a flood-lighted stand, facing the golf course and a small river, and were presented to 8,000 citizens of Rochester and vicinity. About an hour was occupied in brief addresses, given by a number of the distinguished guests.

Commander Fischer, of the local post, called, in turn, on Floyd B. Olson, governor of Minnesota; Frank B. Kellogg, former secretary of state, once a resident of Rochester, and now a judge of the Permanent Court of International Justice; Fred W. Sargent, president of the Chicago and Northwestern Railway, and National Commander Hayes.

These speakers were followed by four who represented the medical profession. Dr. Francis J. Savage, president of the Minnesota State Medical Association, extended greetings from the 2,000 physicians of the state.

"We hope," he said, "that the high standards of medicine and surgery, which have been fostered here in Rochester under your guidance for so many years, will continue as a stimulus toward the maintenance of similar standards throughout our state for many years to come."

Doctor Savage, "as illustrative of the feeling

of friendliness and respect" in which the Doctors Mayo are held by their fellow physicians, then read part of a letter that had been authorized by the council of the Minnesota State Medical Association, and sent to the two brothers.

Dr. Walter A. Bierring, of Des Moines, president of the American Medical Association, said that he considered it "distinctly one of life's privileges to be present and bring cordial greetings on behalf of the American Medical Association."

"Coming to these unbroken prairies the elder Mayo blazed the trail of the medical pioneer, and then let the mantle fall on the shoulders of two worthy sons.

"They have contributed no small part to the remarkable evolution and progress of medical education in America during the last thirty years."

Dr. Bierring was followed by Dr. William D. Haggard, of Nashville, president of the American College of Surgeons. He spoke, in part, as follows:

"The unprecedented nature of the president's participation, as the honorary commander-in-chief of the American Legion, is an honor to which no man can be insensible. It carries the tribute of that great-hearted national humanitarian to the humanitarianism of two also of heroic mold."

The last speaker to represent the medical profession was Dr. Morris Fishbein, editor of the *Journal of the American Medical Association*.

"As a spokesman for organized medicine on this occasion," he said, "may I say that it is my firm belief that only an early affiliation with organized medicine, only mutual confidence between the medical profession and the leaders of this great institution, only that constant interchange of medical work and medical thought, which makes scientific medicine stand superbly above all other sciences and organizations in its ethics and its morale could have permitted the full flowering of the genius which is here apparent. Dr. William Worrall Mayo was himself an organizer of one of the constituent branches of the American Medical Association. In many great medical organizations Drs. William J. and Charles H. Mayo have taken a significant part. Each of them has been on occasion president of the American Medical Association. They have served on scientific boards, on committees, and in many other ways have given freely of their advice and ability for the benefit of their fellow physicians. Yet in all of this work they have conserved the ideals of the profession which every young man receives at his alma mater."

These representatives of the medical profession were succeeded by two representatives of the American Legion: Gerald V. Barron, National Legion committeeman from Minnesota, and Earl V. Cliff, vice chairman of the National Legion Rehabilitation Committee.

To all of these short addresses, Dr. William J. Mayo made response, speaking also in behalf of his brother, who stood beside him on the platform. Parts of Doctor Mayo's speech follow:

"The American Legion, in distinguishing us with its citation for service to the American soldiers, through us pays tribute not only to the 40,000 members of the medical profession who took so honorable a part in the Great War, but also to all members of the medical profession who since the war have served so conscientiously and faithfully in the care of disabled veterans."

"My brother and I greatly appreciate the honors that are being conferred upon us. We realize, however, that we are not the cause, but rather the occasion of the ceremonies which take place tonight and tomorrow."

"We express our thanks to the American Legion for their kindness to us personally. And we may speak for all in voicing appreciation of the service the Legion has rendered this community and the state in acting to bring the President here. The visit the President so graciously makes will be a source of inspiration and renewed courage and enthusiasm to all."

President Roosevelt Arrives on Wednesday

At 5 a. m., August 8, the President arrived in Rochester aboard a special train from the Twin Cities, and a little later most of the residents of the city looked out with despair on low, tumbling clouds which it seemed any second must loose a torrent on bunting, flags and enthusiasm. Miraculously the sky cleared, however, and by eight o'clock one of the sunniest, hottest days of the summer had begun.

Several thousand citizens had gathered at the railroad, to view the train and to await the appearance of the president. Among these citizens were the Mayo brothers, Governor Olson, and representatives of the American Legion, who boarded the train to greet the president.

After leaving the train, the first objective of the presidential party was Mayo Park, where the President placed a wreath at the base of the statue of Dr. William Worrall Mayo. The party then spent about half an hour inspecting The Mayo Clinic.

From there, the President went to Soldier Field, to participate in the program. When he entered the field, "Hail to the Chief" chimed out from the carillon on the tower of the clinic, and

the same air was rendered by the drum corps of the William T. McCoy Post of the Legion.

Following preliminary ceremonies and remarks, National Commander Hayes presented the citation to the famous brothers:

"The high esteem in which the Drs. Mayo are held by their comrades—three-quarters of a million Legionnaires—is best expressed in a resolution adopted by the national executive committee of the Legion at its last meeting, held in May. This resolution reads as follows:

"WHEREAS, The American Legion has always recognized the welfare of humanity and especially the former service man and his dependents, and

"WHEREAS, during the fifteen years of the organization of the American Legion the continuous and unselfish service rendered the World War veterans and their dependents by Dr. William J. Mayo and Dr. Charles H. Mayo, of Rochester, Minnesota, is outstanding and of great merit; now, therefore, be it

"Resolved, by the National Executive Committee of the American Legion, this fourth day of May, 1934, that said Dr. William J. Mayo and Dr. Charles H. Mayo be cited by the American Legion for distinguished service to our sick and disabled comrades and to humanity in general, and that a suitable citation be prepared and presented to them."

"We of the Legion hold in deep respect the man who serves his country in time of great emergency; who continues that service to his community, state and nation in time of peace, and whose breadth of vision and compassion extend beyond geographical lines to an unselfish service to all humanity. In each of the Mayo brothers we find that kind of man. We take a justifiable pride in the fact that they are Legionnaires by right of eligibility, through their service in the World War, and by desire in upholding Legion ideals."

A bronze plaque was next unveiled by a grandson of Dr. W. J. Mayo and a granddaughter of Dr. C. H. Mayo. The plaque was designed by Legionnaire Harold H. Crawford, Rochester architect, the profile portraits of the two brothers were modelled by a daughter of Dr. C. H. Mayo, Mrs. George T. Trenholm, of Rochester, and the sculptor was Charles Brioschi of Saint Paul. This artistic commemorative creation was presented by President Roosevelt, extracts from whose address follow:

"I hope that the people of Rochester will not feel limited in their pride of possession when the nation which I have the honor to represent claims the right to call Dr. Will and Dr. Charles by the good word 'neighbor.' You are beloved at home and abroad and a world deeply in your debt gives you inadequate return in external honors and distinctions. But your true distinction is in the simple fact that you have put men's sense of brotherhood and interdependence into a setting and have given it a new meaning.

"For fifty years you have given tireless, skillful and unselfish service here in this state and city. These fifty years, the span of your medical practice, have covered probably the most remarkable period in the history of science. You have seen practically all of modern medicine and surgery come into being. The rise of research, dating back to the days when you began your practice, has revolutionized the diagnosis, prevention and treatment of disease."

"You have helped to give to the medical profession a unique place in the community and the nation."

"Those of us who are concerned with the problems of government and of economics are under special obligation to modern medicine in two very important respects. In the first place, it has taught us that, with patience and application and skill and courage, it is possible for human beings to control and improve conditions under which they live. It has taught us how science may be made the servant of a richer, more complete common life. And it has taught us more than that, because from it we have learned lessons in the ethics of human relationship—how devotion to the public good, unselfish service, never-ending consideration of human needs—are in themselves conquering forces.

"Democracy looks to the day when these virtues will be required and expected of those who serve the public officially and unofficially. Modern medicine has set an exalted example. It has shown the way for us all.

"You whom we honor today have rendered the highest form of patriotic service during the battles of the World War, but, even more than that, you deserve the nation's thanks for the national service that you have rendered throughout your lives."

For the two hours following the ceremonies at Soldier Field the President was the guest of Dr. and Mrs. Charles H. Mayo, at their home, three miles southwest of Rochester. Here the presidential party had luncheon, thereafter passing through the city in automobiles. A short pause was made at St. Mary's Hospital and then the convoy continued through Rochester and on toward the Mississippi River.

The President viewed a Mississippi River dam in process of construction at Minnieska and then proceeded to Winona where he again boarded his train, which, while the ceremonies were in progress in Rochester, had moved to Winona.

A SIMPLIFIED METHOD OF UVULA AMPUTATION

GERALD M. KOEPCKE, M.D.

Minneapolis

The uvula may cause a variety of symptoms, which may necessitate its amputation. The literature contains many methods for its removal, but the majority of them require special instruments and special technic.

I wish to present a simple method of amputation, which leaves the uvula, when healed, without a trace of an operative defect.

The procedure is as follows: The uvula and adjacent tissue is swabbed two or three times with a 10 per cent solution of cocaine hydrochlorid, which is usually sufficient to assure a fairly complete anesthesia.

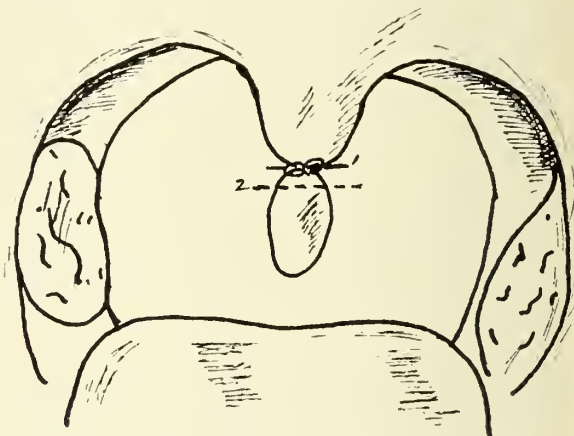


Fig. 1. (1) Tied silk suture. (2) Line of amputation.

A loop of braided silk or catgut suture is made and arranged over the end of a hemostat. The end of the uvula is grasped with the hemostat and the uvula is placed on slight tension. The suture is then slipped forward over the end of the hemostat onto the uvula to the location desired. The loop is then tightened and the tissue compressed, care being taken not to break the membrane with the suture. Following this ligation, the distal end of the uvula, just below the suture, is amputated, allowing a small stump to remain, so that the tied suture will not slip off. The cut surface is cauterized with phenol.

In four to five days this stump will slough off and healing will result in a clean, round wound.

When thoroughly healed, the uvula shows no scarring and the function of the soft palate is not impaired.

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BUSINESS MANAGER

J. R. BRUCE, Saint Paul

Volume XVII SEPTEMBER, 1934 Number 9

Honoring the Mayo Brothers

Hero worship has always been a human trait and always will be. We love to honor those who have shown outstanding meritorious achievement of any kind. The presentation last month of a citation by the American Legion to Dr. Will and Dr. Charlie Mayo, as these two world renowned surgeons are best known at Rochester, was the occasion of ceremonies participated in by thousands of Legionnaires, guests and spectators, and was so planned that President Roosevelt took part in paying tribute to the Mayo brothers.

During the World War the Mayo brothers were in a position to render great personal service at the Surgeon General's headquarters in Washington, where one of them was constantly on duty, and also at Rochester, where the facilities of The Mayo Clinic were largely utilized by the Government in the training of officers of medical corps. It was, however, in recognition of the distinguished service rendered to disabled veterans of the World War since the Armistice

and to humanity in general that the Legion presented the brothers with a citation for their unselfish service.

With so much loose talk nowadays of the failure of the so-called capitalistic system, sight is often lost of the large contributions made to public welfare by those who have profited in large measure through individual initiative. Many instances come to mind where private wealth has been turned over to endowments for the betterment of mankind. Many contributions of funds and service have never become known. The contributions of the Mayo brothers have been of both kinds, but their contributions to medicine in general are outstanding. The generosity of which theirs is an example is one justification for the American system which so far has given rein to individual initiative.

American Dental Association Meeting

A meeting of the American Dental Association resembles in many respects one of the American Medical Association. At the seventy-ninth annual meeting of this national organization of dentists held last month in Saint Paul more than 4,000 of the total membership of 33,000 registered. Although a poor registration had been predicted because of the distance of Saint Paul from the larger population centers in the East, this year's attendance was greater than that in Buffalo two years ago. Last year's meeting was, of course, larger, the association having met with the Chicago Dental Society in Chicago at the time of the World Fair. Doubtless the vacation committee of the association which disseminated information in advance to the membership regarding desirable vacation points in Minnesota and the Northwest and maintained a vacation booth at the meeting was largely responsible for this satisfactory attendance in Saint Paul.

The Dental Association had its sectional meetings, eight of them going at full blast simultaneously for four half-days. The titles of sections such as Orthodontia, Periodontia and Partial

Denture Prosthesis are somewhat mystifying. After all an M.D. is not a D.D.S., nor vice versa, although some have vainly argued this should be. Only the occasional dental student takes both degrees with dental surgery in mind.

American dentistry has without doubt led the field. More specialization in this country may have been a factor. Twenty years ago dentists who had been trained in America were much in demand in such European centers as Vienna and Berlin, at least.

The realization of the importance of dental infections did much for dentistry. The adoption of aseptic technic in the placement of fillings has produced better results. While the pendulum swung too far in the direction of radicalism in tooth extraction, the medical profession was partly responsible and a more conservative attitude is now evident on the part of both the dental and the medical profession.

The dental and medical professions have a common aim and have much the same problems as far as practice is concerned. Coöperation between the two professions has always existed and, it is to be expected, will continue.

Laboratory Technicians

The laboratory technician is a comparatively new creation. As was true of the training of the physician not so long ago there has been a woe-ful lack of uniformity in educational qualifications and laboratory training of the members of this new profession. Minnesota has had its quota of privately owned schools for technicians operated by lay individuals as commercial enterprises and which have not hesitated to use high pressure advertising methods in obtaining students.

The need for establishment of some order in the evident chaos in this new field has been manifested for some time. The American Society of Clinical Pathologists accepted the challenge by the formation in 1928 of a Board of Registry of Laboratory Technicians. This Board is entirely voluntary and has no legal status but has been devoting its energies in the interest of better medical laboratory work. The American Medical Association and the American College of Surgeons have coöperated with the Board, and, following a survey of some two hundred schools

for technicians in this country now being made by the Council on Medical Education of the American Medical Association, the schools meeting the minimum standards will receive certificates issued jointly by the Board and the Council. The medical profession is directly interested in better laboratory service and it is proper that our national organization should have a large part in regulating laboratory work.

The present educational requirement consists of four years of high school, a year of college (to be expanded to two years of college in 1936) and at least twelve months' training in a recognized laboratory. Regulation must move forward gradually. One year of college work devoted to chemistry and biology which is included in the present requirement of the Board on preliminary education seems advisable. The proposed increase to two years of college may be desirable but more than two years of college work would seem a needless expenditure of time and money in preparation for this work.

An article on the subject by Dr. Kano Ikeda, secretary of the Board, entitled "The Laboratory Technician," written especially for the information of our readers, appears in this issue.

SERUM THERAPY IN POLIOMYELITIS

Notwithstanding the total failure of statistical presentations to make a case for serum therapy in this disease, clinical observations almost universally indicate rapid symptomatic response to serum administration. There seems to be an immediate drop in temperature and improvement in symptoms that cannot be totally disregarded. These clinical results have been shown equally after both normal adult serum and convalescent serum, so that there seems to be little preference between these two types of serum. Reports on the use of serum for passive protection in epidemics are inconclusive. It will be difficult to evaluate the efficacy of a prophylactic agent in poliomyelitis on account of the low attack rate even in epidemics, and because there is no method of defining the susceptible group. More data and observation are needed before the final opinion can be given as to the value of serum treatment and prophylaxis in poliomyelitis. (Jour. A. M. A., July 28, 1934, p. 262.)

TOLERANCES FOR ARSENIC, COPPER AND LEAD IN FOODS

The Committee on Foods reports that foods to be eligible for acceptance shall not contain arsenic, copper or lead by contamination in excess of the tolerances established by the United States Department of Agriculture: (a) 1.06 parts of arsenic (as As) per million of food [1.4 parts of arsenic (as As₂O₃) per million of food]. (b) 30 parts of copper (as Cu) per million of food. (c) 2 parts of lead (as Pb) per million of food. (Jour. A. M. A., July 7, 1934, p. 29.)

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association

B. J. Branton, M. D.

W. F. Braasch, M. D., Chairman

J. C. Michael, M. D.

Newspaper Criticism of the Profession

Several Northwest newspapers, notably a recent issue of the *Minneapolis Tribune*, have taken a critical attitude toward the medical profession because of their stand in regard to the socialization of health service. Without careful investigation of the facts in the case editorial disapproval has been expressed and accusations made to the effect that the position taken by organized medicine was influenced by selfishness and showed lack of vision. They have accepted without question statements made by representatives of those organizations that are endeavoring by every possible means to force socialization of medical care.

It is frequently stated that the public is not receiving the medical care it deserves, and particularly that people with low incomes are inadequately cared for. Such statements should be challenged and the accusers be made to produce the facts. While there may be isolated examples of inadequate care among the impoverished classes in some of the larger communities, this is certainly not true in the country as a whole. With but few exceptions members of the medical profession give a considerable portion of their time and effort to individuals whose incomes are temporarily reduced, in many instances knowing that they will never be paid for their services. Certainly there are but few physicians who would refuse to give aid to any deserving individual who comes for relief. A recent survey made of the income of the medical profession in this and adjacent states shows that no revenue is derived from fully one-third of the patients. The medical profession receives no credit for this, nor does it expect it.

It has previously been stated that if the majority of the newspapers were no better informed in other affairs than they are in medicine, the general misinformation must be so great as to make them of doubtful value. Apparently the press is not aware of the fact that the officials

of the American Medical Association have accumulated data concerned in the subject of socialization of medicine over a period of many years. Investigations have been made of the various efforts to socialize medicine tried in other countries. Enough time has elapsed to appraise many of these efforts and it is quite evident that they have not alone failed in their objectives, but have lowered the standards of medical care and introduced many new complications in the care of the sick. These data are available in various articles and bulletins published by the Bureau of Economics of the American Medical Association and deserve careful perusal.

Laymen who are endeavoring to force the socialization of medical services make the fundamental error of regarding medicine as just another commodity which can be similarly disposed of. They forget that its consistency is largely of the mind, that it is indelibly a part of the individual physician, and cannot be regulated or disposed of like other commodities. In the hysteria for socialization now rampant it is apparently forgotten that medicine is still as much an art as a science. The importance of the personal relationship between physician and patient, and the necessity of stimulation to individual effort for the progress of medicine and also for the best interests of the patient are also overlooked. Curiously enough, the bait that some of the proponents for socialization hold out to the profession is a promise of an income considerably larger than the average physician now enjoys. If the medical profession were remunerated according to the scale proposed, the government, and that means the public, would have to pay far more for their medical services than they are now doing. It is apparently overlooked that with bureaucratic control of medicine political factors would rapidly invade the ranks, with deterioration of service, and that graft and corruption would eventually destroy one of the finest assets that civilization has as yet produced.

Misguided idealists are taking advantage of a

perplexed public in a time of economic distress to foist their experiments and theories on them. Fortunately, medicine today is rapidly becoming well organized and will endeavor to solve the problem of medical care fairly and intelligently. It would hardly seem necessary to restate the increasing efforts made by the medical profession to obviate disease, curtail its virulence, or prevent further inroads; that their main objective always has been and always will be the welfare of the patient. They do not intend to have the noble heritage of medicine carefully reared through past centuries become the subject of governmental and political control. That a profession knowing its own problems and its own limitations far better than anyone else would be so short-sighted as to follow the will-o-the-wisp of medical socialization is inconceivable.

Conservative Dentists

American physicians watched with great interest the deliberations of the House of Delegates of the American Dental Association in Saint Paul.

The economic and social problems of medicine and dentistry have much in common. Certain it is, at any rate, that any official reorganization of one will inevitably involve the other.

If the dental association had officially accepted health insurance, and, specifically, prepayment plans for the provision of dental service, the position of organized medicine which defined its policy on these matters in no uncertain terms at Cleveland might well have been weakened.

There is every indication, however, that the dentists will stand by their traditional professional conservatism in all matters that might lead to socialization of professional services. They elected their officers for next year on a platform of conservatism as opposed to candidates who were known to hold very liberal views.

The fact that newspaper reports of the proceedings indicated a livelier interest in radical proposals than subsequent elections actually proved to have been the case shows, among other things, that such proposals have what is known as "news value," to the newspapers.

The newspaper report of the talk made by Dr. F. C. Warnshuis of Michigan, speaker of the

House of Delegates of the American Medical Association, indicated an enthusiastic espousal of the cause of health insurance on the part of both Dr. Warnshuis and the dentists.

Not Reported

As a matter of record, however, Dr. Warnshuis received his warmest applause after a declaration of the necessity for the medical and dental professions to adhere to their time honored methods of practice. They must not allow themselves, he said, to be lured into any experiments that sacrificed individualism or permitted of compulsion or control by the state. This part of Dr. Warnshuis' talk was not reported.

Sentiment among members of the Michigan House of Delegates has changed completely, according to reliable reports, on the subject of the so-called Michigan Plan, referred to by Dr. Warnshuis and outlined previously in these columns; also health insurance in general. It is altogether probable that the plan will be overwhelmingly rejected when it comes up for final vote this month.

The dentists adopted a ten point program of their own at the Saint Paul meeting which is, however, not comparable to the medical association's ten points except in point of numbers.

Dental "Ten Points"

The dental program is a tentative declaration of principle adopted in preparation for a possible "economic securities" act which may in the future deal with old age pensions, benefits for unemployment and health. It was reported as follows:

Organization dentists should be represented in the formulation of such an act.

It should provide dental care for indigents and needy children.

Consideration should be given to needs and obligations of the people and the taxpayers and to interests of the profession.

Plans should be adaptable to local conditions. Profit-taking agencies should be excluded.

Dental service and methods of practice should be under control of the profession.

All licensed dentists should be eligible.

Service under the program should be optional.

Dentists should be free to reject patients.

There should be an adequate dental educational program for the public.

County Committees Of Three

Committees in county medical societies whose sole function should be to assist with the operation of local medical relief were first proposed in the bulletin called "Medical Care in the Home" which went to all Minnesota physicians a year ago.

They were duly appointed as suggested in a few counties and they actually functioned in still fewer. But the success of the relief program in those in which they did function has shown clearly the worth of such committees.

It has prompted officials of the State Relief Administration to ask especially that such committees, preferably composed of three members, be organized in every county in the state.

The advantages of these committees to physicians as well as relief officials are obvious. Officers, councilors and local secretaries of the Minnesota State Medical Association are now engaged in a special campaign to secure their organization.

Now Organized In 46 Counties

A survey made by the state office recently showed that a total of forty-six counties have committees of some sort now to handle local problems of relief.

Only a fraction of these have committees whose sole function is facilitation of medical relief.

Some of the committees reported are in fact large community relief committees, made up of lay officials of the community and local dentists as well as doctors. These are *not* medical committees appointed to deal exclusively with medical relief. They will not take the place of the so-called Committees of Three.

Their Functions

As defined recently by the Emergency Advisory Committee of the Council, the functions of these Committees of Three are very real and important. And they are not exclusively advisory.

It will be their task, if there is a dispute about the bill sent in to the relief administration by any physician in their locality, to adjudicate that bill.

If the bill is, in fact, a just bill, it will be their duty to explain it to the relief worker.

If the bill is not a just bill, it will be their duty to explain the matter to the physician.

That means, of course, that the Committee of Three must be a hard working committee. It must be absolutely honest and it must have courage. It must have the respect of other physicians, of the relief worker and of the State Administration officials in St. Paul. Otherwise it is a worthless committee and the way lies open for the employment of state physicians for the emergency medical care of the poor.

They Do It In Wisconsin

Great hope for the successful operation of these committees in Minnesota is to be found in the successful system in operation in Wisconsin.

In Wisconsin, similar Committees of Three members of the state medical society, are required by official regulation of the state relief administration in each county. These committees are official units of the relief system.

In Minnesota, the opinion of these committees will probably be regarded as final in case of dispute . . . provided their reputation for honesty and courage remains beyond question.

Introducing Mr. Larson

One year of experience with medical relief under the plan for payment with federal funds for emergency medical care in relief homes has now been carefully checked by doctors and State Relief Administration officials.

It may be safely said that both doctors and state officials have learned something in that year.

The result of this experience, so far as the doctors are concerned, takes tangible form this month in the person of Mr. George Larson, formerly of Frederic, Wisconsin, and executive secretary of the Polk County Medical Society there, who becomes the special representative of the Minnesota State Medical Association in the field to assist in the operation of this year's medical relief.

Rural Representative

Mr. Larson was chosen for this important job by the House of Delegates of the State Association in Duluth. As secretary of the rural county medical society, he is familiar with all of the problems and difficulties of medical practice in rural communities. In addition, he has taken a leading part in the successful organization of his

county in the Wisconsin relief program last year. His qualifications for similar duty in Minnesota communities are obvious.

The need for a special, organized effort on the part of physicians, to see that medical relief works smoothly and satisfactorily, has been pointed out repeatedly in these columns.

Not only the welfare of relief patients and the efficient expenditure of public funds but the future of medical practice in this state depends upon the wisdom and conscience and energy of the medical profession in the operation of this program.

There is no doubt in the minds of relief officials that relief, on approximately the present scale, will be continued in this country for a tentative period of at least ten years.

Medicine's Share

The fact that emergency medical relief work under the original plan has worked out satisfactorily in a large number of communities shows clearly that the scheme for leaving this care in the hands of the family doctor or the doctor selected individually by the patient himself is sound and feasible.

With the organization of proper committees and the assistance of Mr. Larson there is no reason why these successful communities cannot be multiplied indefinitely so that it may be said proudly of organized medicine that it did more than its share in partnership with the federal government.

Cards For Health

Gay blue, green, red or silver cards go out with monthly statements from the Duluth Clinic. They bear among others the following legends:

"Your life is your most precious possession. Have an Annual Health Examination."

"Regularity of Good Habits Promotes Longevity. Get the habit of having an Annual Health Examination."

"Spring is the season of new life as reflected in nature and mankind. An Annual Health Examination may help you to retain that feeling throughout the year. Have you had yours?"

Let Us Be Sure

An increase in malpractice litigation in New York, is reported by the July issue of *The New York State Journal of Medicine*.

Editorially, this increase is laid, in part, to a more explicit codification of the rights and duties

of the physician; in part, to a growing tendency on the part of the public to evade its financial obligations to the medical profession.

Concerning the difficult question of medical testimony in malpractice suits, the editorial says:

"Let us be sure that the physician violates some duty which he owed his patient, which in itself produced the results of which complaint is made; let us make sure that the patient himself was free from any fault or neglect which might have induced his present plight and let us so act in the consulting room, that casual comment cannot be mistaken. Before all, let us not make any patient feel that only we, ourselves, could have been his medical savior."

Minnesota State Board Of Medical Examiners

Winona County Man Convicted Of Violation Of Pharmacy Laws

State of Minnesota vs. A. L. Collen

A. L. Collen, forty-eight years of age, was found guilty on July 10, 1934, by Honorable Leo F. Murphy, Judge of the Winona Municipal Court, of violating the pharmacy laws of the state and was sentenced to pay a fine of \$50.00 or serve ten days in the Winona county jail. Collen served the ten days.

Collen was charged with operating a drug store at the village of Dakota in Winona County without having his place of business "in charge of a registered pharmacist, or, during the temporary absence of such registered pharmacist, in charge of a registered assistant pharmacist." The investigation was conducted by Mr. Frank J. Albreter, representing the State Board of Pharmacy.

Collen was acquitted by a jury in October, 1932, at Winona of a charge of practicing healing without a Basic Science Certificate. (MINNESOTA MEDICINE, December, 1932.) In the present case he claimed that he was being persecuted by the state, although admitting that he had no Minnesota license to practice pharmacy. Collen holds no license of any kind in Minnesota but claimed that he had proper credentials in the State of Illinois.

E. D. Libera, County Attorney of Winona county, prosecuted the case for the State. Collen acted as his own attorney.

Medical Board Refuses To Renew Masseur's License

Matter of Renewal of License of Leonard James Chmel, Masseur

At a meeting of the Minnesota State Board of Medical Examiners held on July 14, 1934, the Board voted not to renew the license to practice massage formerly held by Leonard James Chmel who, until early this

spring, maintained an office at 3009 Nicollet Ave., Minneapolis.

Early in January a complaint was made to the State Board of Medical Examiners concerning the treatment administered by Mr. Chmel to a patient in Minneapolis who was afflicted with asthma. The patient died on March 5, 1934. The testimony before the Board showed that the patient was placed upon an orange juice and beef broth diet by Mr. Chmel; that the patient was kept on this diet for approximately five weeks, at the end of which time a physician was called to take over the case.

Masseurs are licensed to give only massage treatments. They are not permitted to prescribe diet nor to practice medicine. In 1930 Chmel was cited before the Board to show cause why the Board should not refuse to renew his massage license. At that time Chmel was using the title of "Doctor" and "Napro-path."

The Board feels in the present case that in order to safeguard the public Chmel's license to practice massage should not be renewed. Although Chmel was furnished with a copy of the charge against him he made no appearance before the Board.

Little Falls Midwife Warned By Medical Board

Following an investigation conducted by the State Board of Medical Examiners into repeated complaints that Mrs. Regina Krzan Dlugi, fifty-three years of age, was practicing medicine and healing without a license, a warning was issued to her to cease such practice, and to confine her work to that of midwifery.

Mrs. Dlugi lives on a farm about two miles east of Little Falls and while she holds a license from the State Board of Medical Examiners to practice midwifery, she has been selling roots and herbs and medicines of various types. In view of all the circumstances in the case, it was thought best by Mr. Austin L. Grimes, County Attorney of Morrison County, and Mr. Brist, representing the Medical Board, that a warning be issued to this woman. Mrs. Dlugi was emphatically told that any violation of the Medical Act or the Basic Science Law in the future would result in her being arrested and brought into court for trial. Mrs. Dlugi admitted having taken care of a number of persons without being licensed to do so, but stated that this was due to the necessity of her making a living. She was informed that that was no excuse for violating the Medical Act and the Basic Science Law, and in a written statement which she signed in the office of Mr. Grimes, she promised that there would be no violation of these laws in the future.

The Medical Board respectfully asks that if any one has any knowledge of Mrs. Dlugi's practicing any form of healing except that of midwifery after August 15, 1934, that it be reported to the Board at 524 Lowry Medical Arts Bldg., Saint Paul.

The Board wishes to express its sincere appreciation to Mr. Grimes for the coöperation he rendered in this case.

Park Rapids Chiropractor Sentenced To Two Years At Hard Labor

State of Minnesota vs. Katie Mae Jenks, D. C.

Mrs. Katie Mae Jenks, forty-five years of age, licensed to practice chiropractic since 1919, entered a plea of guilty to a charge of criminal abortion on July 25, 1934, before the Honorable Anton Thompson, Judge of the District Court at Alexandria, Minnesota. The Court sentenced Mrs. Jenks to a term of two years at hard labor in the Women's Reformatory at Shakopee, Minnesota. Mrs. Jenks started serving her sentence July 30.

Early in June a five months' fetus was discovered in a newly made grave near Bluffton in Otter Tail County. The matter was reported to the authorities of Otter Tail and Wadena Counties and later to the State Board of Medical Examiners. Following an intensive investigation warrants were issued for the arrest of Mrs. Jenks, who had an office at Park Rapids, and for Lester W. Mansur, Wadena.

Mansur, twenty-nine years of age, confessed to hiring Mrs. Jenks to do an abortion on a friend of his residing near Sebeka. Mrs. Jenks was paid \$35.00 for her "service." The abortion was attempted at Park Rapids but was not a success; it was attempted again and finally completed at Wadena by Mrs. Jenks. Mansur received a sentence of one year in the state prison at Stillwater for his part in the affair.

Judge Thompson, who resides at Fergus Falls, severely rebuked Mrs. Jenks for engaging in such an occupation. The Court also informed Mansur that his part in the crime was not to be tolerated by the law. Judge Thompson commended the authorities of Otter Tail, Wadena and Hubbard Counties and the State Board of Medical Examiners for working on the case until it was solved.

The Medical Board believes that the splendid work of the following men should be made known, especially in view of the fact that the case involved the jurisdiction of three counties and very little evidence was available at the start of the investigation:

Mr. Charles L. Clark, County Attorney, Hubbard County.

Mr. Ed Churchill, Sheriff, Hubbard County.

Mr. Hugh G. Parker, County Attorney, Wadena County.

Mr. John Bengtson, Sheriff, Wadena County.

Mr. R. C. Kassube, Chief of Police, Wadena.

Mr. A. O. Lee, Police Officer, Wadena.

Mr. John L. Townley, County Attorney, Otter Tail County.

Mr. J. C. Henkes, Sheriff, Otter Tail County.

Wadena Woman Pleads Guilty To Unlawful Practice Of Healing

State of Minnesota vs. Letha Beach, Alias Letha Byers

Mrs. Letha Beach, alias Letha Byers, thirty-nine years of age, entered a plea of guilty to a charge of practicing healing without a Basic Science certificate when arraigned before the Honorable Anton Thompson, Judge of the District court at Fergus Falls on August 3, 1934.

Mrs. Beach was arrested on July 31 following an investigation conducted by the State Board of Medical Examiners in coöperation with Sheriff John Bengtson of Wadena county and Sheriff J. C. Henkes of Otter Tail county. The investigation disclosed that on June 26, 27 and 28, Mrs. Beach represented herself as a physician from the state of Nebraska and sold roots and herb medicine to two different parties at Henning, Minnesota, obtaining \$4.00 from one and \$15.00 from the second patient. Mrs. Beach also falsely represented herself as being associated with members of the medical profession in that vicinity. Mrs. Beach is not connected with any members of the medical profession and so admitted when questioned under arrest.

The defendant admitted she knew nothing about the practice of healing and also admitted that she is the same party that a warrant was issued for in September, 1928, in Redwood county, Minnesota. She was not arrested at that time because she found out she was under investigation and immediately left the community. Mrs. Beach was engaged in the same type of "healing" in 1928, selling roots and herbs at Wanda.

Judge Thompson sentenced the defendant to a term of one year at hard labor in the county jail of Otter Tail County and placed her on probation until December, 1935. The defendant is to refrain from practicing healing in any form in this state and is to return the money she obtained from her patients at Henning. The Court in very strenuous terms denounced the conduct of the defendant and informed her that if any complaint was made about her violating the law in the future she would have to serve her entire sentence.

The Medical Board wishes to acknowledge the splendid coöperation shown in this case by Sheriff Bengtson of Wadena and Sheriff Henkes of Fergus Falls. The state was represented by Mr. John L. Townley, county attorney of Otter Tail County, who once more showed his willingness to assist the Board in eliminating such quackery.

List Of Physicians Licensed By The Minnesota State Board Of Medical Examiners, July 14, 1934 June Examination

By Examination

Adkins, Galen Horatio, U. of Minn., M.B., 1934, Minneapolis, Minn.
 Barton, John Currer, U. of Minn., M.B., 1934, Wauwatosa, Wis.
 Bate, Leonard Coleman, U. of Minn., M.B., 1933; M.D., 1934, St. Paul, Minn.
 Beek, Harvey Ogden, U. of Minn., M.B., 1933; M.D., 1934, St. Paul, Minn.
 Bowers, Warner Fremont, U. of Nebr., M.D., 1932, Minneapolis, Minn.
 Brust, John Calvin M., Syracuse U., M.D., 1929, Rochester, Minn.
 Canfield, Bruce H., U. of Minn., M.B., 1933, St. Paul, Minn.

Clifford, Geo. William, U. of Minn., M.B., 1932; M.D., 1933, Osakis, Minn.
 Coddon, Walter David, U. of Minn., M.B., 1934, St. Paul, Minn.
 Curtis, Rauen Archibald, U. of Minn., M.B., 1933; M.D., 1934, Osseo, Minn.
 Dahlquist, Ralph Morris, U. of Minn., M.B., 1934, Hackensack, N. J.
 Flynn, John Edward, Jr., U. of Minn., M.B., 1934, St. Paul, Minn.
 Greenberg, Harold Armand, U. of Minn., M.B., 1932; M.D., 1933, St. Paul, Minn.
 Holt, Geo. Waltermann, U. of Pa., M.D., 1933, Minneapolis, Minn.
 Jacobs, Douglas Lien, U. of Minn., M.B., 1934, Eloise, Mich.
 Laymon, Carl Warren, U. of Minn., M.B., 1930; M.D., 1931, Minneapolis, Minn.
 Leclercq, Geo. Theo. A., U. of Minn., M.B., 1933, Minneapolis, Minn.
 Levant, Arthur Buchman, U. of Minn., M.B., 1934, Minneapolis, Minn.
 Lind, Carl John, Jr., U. of Minn., M.B., 1933; M.D., 1934, Minneapolis, Minn.
 Lund, Carl John Theo., U. of Minn., M.B., 1932; M.D., 1933, Underwood, Minn.
 Merritt, Wallace Alfred, U. of Minn., M.B., 1932; M.D., 1933, Albert Lea, Minn.
 Monson, Leonard Jerome, U. of Minn., M.B., 1932, Hendricks, Minn.
 Roberts, Stanley Warner, U. of Nebr., M.B., 1933, Minneapolis, Minn.
 Rumball, John Marcus, U. of Minn., M.B., 1934, Rochester, N. Y.
 Sandt, Karl Eugene, U. of Minn., M.B., 1934, Detroit, Mich.
 Sarnecki, Marchislaw Maurice, N. W. Univ., M.B., 1933; M.D., 1934, St. Paul, Minn.
 Stein, Sam Irving, U. of Minn., M.B. and M.D., 1934, St. Paul, Minn.
 Straus, Maurice L., U. of Minn., M.B., 1934, St. Cloud, Minn.
 Trytten, Edwin Gerhardt, Rush Med. Col., M.D., 1934, Albert Lea, Minn.
 Virnig, Mark Phillip, U. of Minn., M.B., 1933, New Richland, Minn.
 Wallace, Marc J., U. of Minn., M.B., 1934, Passaic, N. J.
 Williams, Alvin Bcurlen, U. of Minn., M.B., 1934, San Jose, Calif.
 Zintck, Arthur Raymond, Marquette U., M.D., 1934, Milwaukee, Wis.

By Reciprocity

Haugen, Clifford Olgar, Rush Med. Col., M.D., 1930, Grand Forks, N. D.

By National Board

Catlin, Theodore John, U. of Minn., M.B., 1932; M.D., 1933, Buffalo, Minn.
 Shellman, McClelland, U. of Minn., M.B., 1933; M.D., 1934, St. Paul, Minn.

President's Letter

The September Postgraduate Course

After the satisfactory response to the postgraduate course last spring, the University is repeating this opportunity for a second intensive two-day course on September 24 and 25. Not only is it offering this course, but it is allowing us to name our own clinical subjects. It will not be possible in two days to cover all the subjects listed below, but those which will be given will be taken from the lists submitted.

One half-day will be devoted to diabetes, from a clinical list submitted by Dr. Wilder; one half-day to tuberculosis, from a list of clinical subjects submitted by Dr. J. A. Myers and a group of tuberculosis sanatoria superintendents; Monday evening will be given over to the subject of cancer, the subjects chosen by Dr. W. A. O'Brien, and one half-day to heart subjects from a list submitted by Dr. Edgar Herrmann. In addition, the staff of the Minneapolis General Hospital is giving a half-day fracture clinic.

The attendance last spring was 128, more than three times that of any previous similar course, and we hope at least to duplicate that record.

The following are the lists of subjects submitted:

Diabetes:

1. The theory of diabetes: parts played by liver, pancreas, adrenals, pituitary.
2. The diagnosis of diabetes: innocent glycosurias.
3. The diet in the treatment of diabetes: high fat versus high carbohydrate.
4. Insulin: indications for its use.
5. The insulin reaction: hyper-insulinism.
6. Educating the patient: what the patient must know.
7. The treatment of the diabetes of children.
8. The complications of diabetes and their treatment.
9. Surgery in the presence of diabetes.
10. Diabetes and pregnancy.

Tuberculosis:

1. The x-ray in tuberculosis with demonstration.
2. Pneumothorax with demonstration.
3. The Mantoux tuberculin test with demonstration.
4. The dangers of tuberculosis to other members of the family.

5. The pathology of tuberculosis with demonstration.
6. Differential diagnosis.
7. The control of tuberculosis during pregnancy.
8. Surgery of pulmonary tuberculosis, including phrenic exeresis, extrapleural thoracoplasty, and pneumolysis.
9. Tuberculosis at the various age periods of life.
10. Epidemiology of tuberculosis—contacts, uncoöperative patients (refuse sanatorium care), discharged ex-service men still infective, teachers, routine examination for tuberculosis.
11. Outline of intensive conservative treatment.
12. The early diagnosis of clinical tuberculosis with the aid of the tuberculin test and the x-ray.
13. The treatment of minimal tuberculosis of the lungs.
14. Prognosis, determination of activity of lesions.
15. Principles of rest treatment of pulmonary tuberculosis.
16. Relation of rest treatment of pulmonary tuberculosis to surgical and other measures.
17. Diabetes complicating pulmonary tuberculosis (treatment).
18. Silicosis, differential diagnosis: x-ray and clinical.

Heart:

1. What constitutes the clinically significant heart in childhood.
2. Prevention of heart disease. An inquiry.
3. The practical therapeutics of cardiac decompensation.
4. Hypertension. What point of view shall we adopt with reference to classification and need of treatment.
5. The coronary heart: signs and symptoms of the less obvious syndromes.
Treatment of the latent period
Treatment of the acute attack
6. The luetic heart: its diagnosis and treatment.
7. Valvular lesions: their prevention; their management.
8. When should one use the electrocardiograph?



President, Minnesota State
Medical Association.

TRANSACTIONS of the MINNEAPOLIS SURGICAL SOCIETY

MEETING OF MAY 3, 1934

The President, DR. KENNETH BULKLEY, in the Chair

THE TREATMENT OF ACUTE EMPYEMA

DR. H. A. CARLSON (by invitation): Empyema is rarely a primary disease. It is nearly always secondary to some other condition and the results of treatment depend to a large extent upon the nature of the primary disease, pneumonia, lung abscess, pyemia, tuberculosis, carcinoma, etc. The virulence of the infecting organism, the age of the patient, and complications are also important.

Uncomplicated unilateral empyema has practically no mortality. Death in empyema is nearly always due to a persistence of the primary disease, the development of complications or some accident of treatment.

The value of any method of treatment is to be judged not only upon the mortality but upon the incidence of chronicity, and the time required for healing. As a matter of fact a review of statistics fails to reveal any conclusive evidence in favor of any one method. On the other hand there is an abundance of evidence to demonstrate that the mortality is determined largely by factors unrelated to treatment. Graphs are presented illustrating this point.

Certain fundamental principles of treatment should guide us in treating empyema. Harrington has listed these principles about as follows: (1) adequate drainage; (2) avoidance of early open pneumothorax; (3) sterilization of the diseased area, and (4) re-expansion of the lung and obliteration of the cavity.

What constituted adequate drainage in one case may be inadequate in another. Some empyema cavities apparently heal without drainage. Aspiration constitutes adequate drainage in many instances. Closed drainage may suffice, but often rib resection and the introduction of a large tube is necessary. An opinion as to the adequacy of drainage must be made in each case on the basis of evidence of sepsis and the tendency of the cavity to heal.

Avoidance of early open pneumothorax in the empyemas of the war time influenza epidemic undoubtedly led to a saving of lives, but the lesson appears to have been well learned, and no extended discussion of this subject is necessary.

Sterilizations of the cavity may be aided by irrigations with Dakin's or other solutions, but the pleura has the capacity of sterilizing itself and some authors believe irrigations are unnecessary.

The principle of re-expanding the lung merits greater consideration than it has received in the past. Re-expansion is provided by differential pressure either by the use of closed negative pressure or by overhead positive pressure. The use of blow bottles, wind instruments, etc., is designed to aid in the expansion of the lung but these methods provide for only temporary in-

flation of the lung. It appears certain that continuous differential pressure is superior to intermittent blowing exercises.

There are essentially three methods of treating empyema: (1) aspirations with or without air replacement; (2) closed intercostal drainage; and (3) open thoracotomy, usually with resection of a rib. Modifications and combinations of these methods have been employed. From a study of 70 cases of acute postpneumonic empyemas, it appears that each of these three methods has certain advantages and disadvantages and each has a field of usefulness.

Aspiration appears to be the safest method of treatment in the early stages before the pus has become thick, before pleural adhesions have formed, before mediastinal stabilization has occurred and during the synpneumonic stage. It is not always wise to persist in the use of aspiration, however, because drainage may be inadequate, frequently sepsis is not relieved and the period of healing and the period of hospitalization are prolonged.

The closed method of drainage is physiologically ideal in providing for negative intrathoracic pressure, but frequently is unsuccessful because the tube becomes plugged. In two-thirds of the cases treated by this method at the University Hospital rib resection was eventually performed.

Open thoracotomy when performed under proper indications does not increase the mortality; it shortens the period of sepsis, the period of healing and the period of hospitalization.

Keeping these fundamental principles in mind I have recently instituted a method of treatment which promises to shorten the period of healing, especially of larger cavities with thick fibrinous exudates.

The method consists of employing aspiration until the pus is thick. Then a rib resection is performed and a large tube inserted, but, instead of leaving the cavity exposed to atmospheric air, a differential pressure is provided by means of a negative pressure system. The wound is sealed by passing the tube through a rubber sponge impregnated with vaseline, which is then snugly pressed against the chest by means of adhesive and elastic bandages. The drainage tube is connected with a pus trap and a controlled negative pressure is maintained by means of a water pump, a manometer and a negative pressure mercury valve. A pressure of 10 to 30 centimeters of water is used.

The results obtained in three cases treated by this method are shown by means of a series of x-ray films.

No rigid routine of treatment is advocated. Empyema should be treated according to the principles enunciated earlier, but when the pus is thick and the cavities large it appears that both adequate drainage and early re-expansion of the lung are of great impor-

tance. These ends can be obtained by the method described, apparently shortening the period of healing and reducing the danger of progression to the chronic stage.

THE TREATMENT OF DEFECTS IN THE LONG BONES FOLLOWING SUB-PERIOSTEAL RESECTION

DR. WALLACE H. COLE (by invitation): The resection of long bones for acute osteomyelitis has fortunately fallen into disrepute but there are still some cases coming into our clinics in which this procedure has been used. I wish to report two cases where this radical treatment was used with no regeneration of bone afterward and consequently the development of marked functional and anatomical deformities. The question of the advisability of resection is answered by a simple examination of the radiographs taken when these cases first reported for reconstruction work.

(A lantern slide demonstration of the cases was then given.)

Case 1.—A boy thirteen years of age, who had had resection of the shaft of the right radius and right tibia for acute osteomyelitis eighteen months before. As a result only a small fragment of the distal end of the radius was left and the tibia was represented by its upper and lower extremities only. The fibula was dislocated at both its upper and lower ends, due to normal growth as opposed to the resected tibia.

The treatment consisted of stretching the soft parts of the leg and getting the fibula into approximately its normal position by skeletal traction through the os calcis. Later the lower end of the fibula was transplanted across into the distal tibial fragment and when this had healed the upper end of the fibula was transplanted likewise. The end-result was a firm union with a straight leg, useful without any external support. The right forearm was treated by dividing the ulna and resecting a small piece of its shaft so as to allow a "Y" reconstruction, the distal radial fragment being used as one arm of the "Y." As the result of this procedure the hand was held in good position and developed excellent function although there was, of course, no supination or pronation.

Case 2.—A boy twelve years of age who five years previously had had resection of the left tibia for acute osteomyelitis. When first seen the upper and lower extremities of the tibia were alone present and there was a marked bowing of the leg with extreme prominence of the upper and lower ends of the fibula. Here again the leg was straightened and stretched by skeletal traction through the os calcis and then later instead of transplanting the fibula a large bony graft was removed from the opposite leg and inserted between the tibial fragments. This healed readily and the graft since that time has definitely hypertrophied so that the patient is now able to get around without any splint support.

These two cases demonstrate the dangers of subperiosteal resection of bone even in children where the periosteum presumably is very active and also show two ways in which defects of the tibia can be repaired, both of which are very satisfactory.

MIXED TUMORS

DR. WILLIAM T. PEYTON: The treatment of mixed tumors is very unsatisfactory. Approximately 45 per cent of those removed from the parotid recur. Two-thirds of all these tumors occur in the parotid, but they

also occur in the submaxillary gland, sublingual gland, palate, pharynx, cheek, lacrimal gland, lips and tongue.

It is proposed to discuss some of the various phases of this lesion in connection with the treatment of patients at the University Hospital.

Thirty-six patients with this type of lesion were seen in the last ten years: twenty-five in the parotid, eight of them recurrent; six in the submaxillary gland, four of them recurrent; two in the cheek, two in the pharynx, and one in the palate.

Late recurrences are prone to be found in this type of tumor. One of the recurrent parotid lesions excised in 1907 recurred in 1932. Recurrences may be due to small masses of tumor cells in the capsules which are left at the time of removal, to a rupture in the capsule during enucleation, or to multiple tumors, one of which was overlooked at the time of operation. Apparent recurrence may also be due to the development of an entirely new tumor.

Recurrences are most common in the parotid tumors where the surgeon in his anxiety to avoid the seventh nerve is more conservative in tissue removal and at times it is necessary to deliberately open the capsule of the tumor, remove its contents, and then depend upon antiseptics or irradiation or both to destroy any remaining tumor cells. In three patients the capsule was thus opened and the tumor content removed; then radium was inserted around the remaining part of the capsule. In one of these cases done two years ago, the patient immediately had a small nodule appear which has remained the same ever since. The other two were done fourteen months ago, and one of these patients has a nodule which promptly reappeared, but has remained stationary; the other has no evidence of tumor at this time.

Three patients came with seventh nerve paralysis; all three proved to have highly malignant tumors, with metastatic lymph nodes in the neck or squamous cell carcinoma in the sections of the tumor.

These highly malignant mixed tumors are rarely, if ever, cured. There were six definitely malignant lesions in this group: one was not traced; two are dead; two are in very poor condition, and one on whom a neck dissection for metastatic nodes was done seven months ago has no evidence of recurrence at this time. The prognosis is so bad in these very malignant lesions that it is questionable whether a neck dissection should be done.

Some of these tumors such as those discussed above are distinctly malignant, but, as a rule, distinction between benign and malignant forms is not well defined. Even the microscopic appearance is not reliable.

To avoid injury of the seventh nerve when the tumor is in the lower part of the parotid, Sistrunk made the incision in the folds of the skin of the neck below the parotid isolated and the inframandibular branch of the seventh nerve and followed it up to the division of the seventh nerve into temporo-facial and cervico-facial divisions, inserting the finger along superficially to the nerve. The tumor is superficial to the finger and the nerve is thus out of danger. A case is demonstrated, however, where the tumor was deep about the trunk of

the nerve before its partition into divisions. The nerve grooved the middle of the tumor. It was isolated and the tumor tipped out from under it.

Seven patients were treated with radiation only and in five there has been complete regression of the lesion. One of these, a mixed tumor of the palate, recurred and the patient is now dead.

Of the remaining two, one remained unchanged and one was improved, but the patient is now in a terminal condition.

THE RESULTS OF CHOLECYSTECTOMY IN TYPHOID CARRIERS

DR. N. LOGAN LEVEN (by invitation): The accomplishment of preventive medicine in practically eliminating typhoid fever from the war zone during the late World War unfortunately has not been duplicated in peace time. Compulsory immunization by vaccination against typhoid and early detection and supervision of typhoid carriers are very difficult to carry out in civil practice.

The involvement in typhoid fever of the biliary system has been known for a long time.

In 1829, Louis pointed out that changes in the biliary tract are much more frequent in the course of typhoid fever than in any other acute disease.

Fütterer, in 1888, was the first to demonstrate typhoid bacilli in the gallbladder. About 70 per cent of gallbladder cultures in fatal typhoid cases show the presence of the *Bacillus typhosus*.

Experimentally and clinically it has been demonstrated that the gallbladder may remain the nidus for the infection long after the disease.

Garbot made an extensive study of the pathogenesis of the carrier state and demonstrated that the carrier distributes bacteria either through the urine or feces or both. In only about 1 per cent does bacilluria continue for as long as two or three months; whereas, in about one third of the cases, positive duodenal or stool cultures were found during convalescence. However, only 3 to 4 per cent continued to be chronic carriers.

The nidus of infection carriers may be: (1) liver; (2) gallbladder; (3) intestine. The great majority are bile carriers and of the gallbladder type. The intestinal carrier is very rare and can be differentiated from the bile carrier by the absence of *Bacillus typhosus* in the duodenal contents. However, it is impossible to differentiate the duct or liver from the gallbladder type of bile carriers preoperatively.

There are two possible modes of infection of the gallbladder: (1) ascending from the bowel; and (2) hematogenous with the excretion of the bacilli in the bile. The evidence favors the latter route since in the early stages typhoid fever is essentially a blood stream infection, and, also, the typhoid bacillus is usually obtained in pure culture from the gallbladder, whereas, an ascending infection should show a mixed type of infection.

In typhoid carriers the presence of gallstones will prevent the gallbladder from freeing itself from typhoid infection indefinitely. As long as a stone remains in the gallbladder it both hinders mechanically the complete

evacuation of the infected bile and reinfects the fresh incoming bile.

Hasland and Whipple, in their combined series of twenty-eight cases of carriers operated upon, found gallstones in 90 per cent of the cases.

Dehler, in 1907, was the first to attempt to cure a chronic typhoid carrier by gallbladder operation. He performed cholecystostomy in two cases, curing one.

Koch (1908) stated that "with the radical removal of the gallbladder the chief focus of the bacillus is removed from the body."

Most of the poor results in operations on typhoid carriers by earlier surgeons were due to the fact that cholecystostomy was the operation of choice.

Hasland reported a series of fourteen cases, twelve of which were known to be typhoid carriers preoperatively. In two others a pure culture of the paratyphoid bacillus was found in gallbladders removed for stones. Eleven of 13 cases surviving the operation were cured of their carrier state.

In Whipple's series of fourteen cases, eight were known to be carriers before operation, and six were probable carriers as demonstrated by routine cultures of gallbladder bile, stones, or gallbladder tissue at operation.

Cholecystostomy cured two patients. In a series of twelve cholecystectomies, eight of ten surviving the operation were apparently cured.

Kehr performed cholecystectomy and common duct drainage with a T-tube in 10 cases, all of which were completely cured of the carrier state. He points out that common duct drainage is necessary as long as bacilli are demonstrable in the bile, since often the drainage through the papilla of Vater is not sufficient after cholecystectomy to clear up the infection in the biliary passages.

Lyon reports a case that continued as a typhoid carrier following cholecystectomy, having a typhoid hepatocholangitis. This completely cleared up on intermittent and continuous biliary drainage and no typhoid bacilli have been found in the course of five years.

I wish to report three cases on which cholecystectomy was performed for a carrier state as well as for clinical gallbladder disease.

Case 1.—A baker, aged 54, was seen March 11, 1930. He had had typhoid fever in 1910 and was found to be a carrier in 1926, when taking the examination in New York State as a food handler. The cholecystogram showed a pathological gallbladder with stones and on March 19, 1930, a cholecystectomy and repair of an umbilical hernia were performed. Culture of the gallbladder bile and gallstones removed at operation demonstrated the presence of typhoid bacilli. Stool cultures were positive two months after the operation. Since then there have been twenty negative stool examinations over a period of four years. Three recent cultures of duodenal contents were negative for the typhoid bacillus.

Case 2.—A housewife, aged 43, was first seen September 1, 1932. She had had typhoid fever in June, 1927, and proved to be a typhoid carrier in October, 1929. She had had symptoms of gallbladder disease intermittently for six years prior to admission to the hospital. A cholecystogram showed a pathological gallbladder. On September 7, 1932, a cholecystectomy and

appendectomy was performed. Cultures of the gallbladder bile, gallstones, and sections of the wall of the gallbladder showed the presence of the typhoid bacillus. In twenty-one stool cultures over a period of eighteen months following operation, the typhoid bacillus was never isolated.

Case 3.—A housewife, aged 33, was admitted to the hospital January 5, 1933. She had had typhoid fever in May, 1931, and had had intermittent attacks of gallbladder disease since August, 1931. She proved to be a typhoid carrier in November, 1932. The cholecystogram showed a pathological gallbladder and on January 11, 1933, a cholecystectomy was performed. Cultures of the gallbladder bile, gallstones, and sections of the wall of the gallbladder showed the presence of the typhoid bacillus. The thirteen stool cultures over a period of fifteen months following operation were consistently negative.

Conclusion.—Since the majority of typhoid carriers are bile carriers of the gallbladder type, it is evident that these unfortunate individuals, who bear the stigma of being a carrier and who are subject to physical and occupational restrictions by the health authorities, can in a large majority of cases be cured of their carrier state by removal of the gallbladder and drainage of the common bile duct.

DYSPEPSIA FOLLOWING CHOLECYSTECTOMY

DR. MELVILLE H. MANSON (by invitation): The most important phase of chronic gallbladder disease, from the patient's point of view, is "What measure of relief may I expect if my gallbladder is removed?" The majority of patients seek relief because of chronic gastric distress and dyspepsia, rather than for typical "stone colic" pain. Therefore, it is justifiable to devote some attention to the end-results as far as these symptoms are concerned.

In general, it may be said that good results follow cholecystectomy in two-thirds or more of the cases. The best results are obtained in patients whose preoperative symptoms include colic, chills, and fever. The presence of stones prognosticates a better end-result. In evaluating "excellent results," "good results," or "poor results," there is obviously room for a wide latitude of opinion. Because of the tendency for some practitioners to discredit the results of surgical treatment because the patient still has selective food distress, or belching of gas after cholecystectomy, and in the hope of being more accurately able to answer the patient's question, as stated above, the following analysis was made.

A questionnaire was sent to 500 patients upon whom cholecystectomy had been performed, of which 230 were returned with the necessary information required for analysis. To the question, "Can you eat types of food which caused distress before your operation?" 67.2 per cent answered, "Yes"; 32.8 per cent answered "No"; 93 per cent reported a good appetite. Thus it is seen that slightly more than two-thirds of the patients had obtained complete relief from selective food distress.

The results of medical management of chronic gallbladder disease with respect to selective food distress,

according to Mason, was that 28 per cent of the patients continued to have their symptoms; 31 per cent showed improvement; and 41 per cent could eat foods which previously disturbed them, *i.e.*, obtained complete relief. Relief from the belching of gas in 100 cases treated surgically was obtained in 83 per cent, whereas, of those treated medically, 66 per cent were given relief.

It is the remaining third of the patients who allow criticism of the results of surgery in chronic cholecystitis with respect to food distress, and it occurred to the writer that this was not justified, for might not individuals with no gallbladder disease exhibit food distress in similar proportions?

	Gall-bladder patients before operation, 250 cases	Gall-bladder patients after operation, 230 cases	Controls, females 30-45 years, 100 cases	Controls, females 18-20 years, 144 cases
	Per cent distressed	Per cent distressed	Per cent distressed	Per cent distressed
Fried meats	76	36	25	2.7
Baker meats	34	14	5	1.0
Pickles—condiments	54	29	15	2.3
Cabbage	66	43	38	17.0
Onions	66	43	29	17.3
Beans	52	40	33	13.8
Raw apples	40	24	17	7.0
Potatoes—fried	66	33	16	3.6
Eggs—fried	60	30	23	5.0
Pie crust	50	27	13	2.0
Nuts	38	25	14	6.0

50 per cent can eat any type of food after cholecystectomy.

67 per cent can eat foods which previously distressed them.

70 per cent of controls (females 30 to 45 years of age) have food distress.

50 per cent of controls (females 18 to 20 years of age) have food distress.

Accordingly, an identical food list in the form of a questionnaire was given 144 student nurses, ranging in age from eighteen to twenty years. A report was also obtained from 100 female out-patients from thirty to forty-five years of age, who had no gallbladder or gastro-intestinal disease, or rather, who had no symptoms indicative of gallbladder disease (see chart).

Although it is apparent that those following cholecystectomy have slightly more distress than the group of women with no gallbladder symptoms, the difference is slight and probably within the limit of error. It was rather surprising to discover that 50 per cent of the young women had food distress. In requesting those in each group to fill out the questionnaire it was emphasized that only foods which caused distress or gas be listed, not foods which were disliked or to which they had a specific idiosyncrasy.

From the results above it may be concluded that the surgical treatment of chronic cholecystitis results in relief from food distress and gas to a point comparable to that of normal individuals.

NEUROGENIC VESICAL DYSFUNCTION: REPORT OF TWO CASES RELIEVED BY PRESACRAL NEURECTOMY AND CYSTOSTOMY

DR. C. D. CREEVY (by invitation): The term neurogenic vesical dysfunction refers to any disturbance of bladder activity resulting from disease of the nervous system and is to be preferred to the older and more ambiguous terms "cord" or "neurogenic" bladder. These disturbances may result from lesions of the brain, spinal cord, peripheral nerves, or of the ganglia in the bladder wall, through injury or destruction of the centers for bladder function or of their afferent or efferent pathways.

I shall limit my remarks this evening to those lesions which affect the afferent paths. They affect bladder function by reducing normal sensation so that the patient is unaware of the degree of filling of his bladder. This leads in time to infrequent voiding and thus to overdistention, which, in turn, causes pressure atrophy of the bladder wall and dilatation of the internal sphincter. Urination is at first infrequent, then difficult, and finally involuntary (overflow incontinence).

Such disturbances are seen in lesions of the frontal lobe (if bilateral), of the caudate nucleus, in tabes dorsalis, multiple sclerosis, syringo-myelia, subacute combined sclerosis (pernicious anemia), in transverse myelitis (traumatic or infectious), and in the congenital defects of the spinal cord, peripheral nerves, or ganglia which are often associated with spina bifida.

If the sensory lesion is complete so that the bladder is totally anesthetic (traumatic myelitis) little more than the establishment of an automatic bladder can be sought; if the sensorium is disturbed, the catheter is usually required. If, however, the sensorium is intact and the destruction of sensory paths incomplete, much can be done.

In early cases without secondary changes in the bladder wall, the patient should be trained to urinate at regular intervals day and night to prevent overdistention.

In more advanced cases with but little local damage, especially during the exacerbations often seen with complicating diseases, a period of intermittent or continuous catheter drainage coupled with training will often relieve the difficulty.

In advanced cases with atrophy of the bladder wall but with a remnant of sensation, drainage alone cannot restore the expulsive force sufficiently to permit emptying of the bladder. Here we may take advantage of the fact that the hypogastric or presacral plexus carries sympathetic fibers which transmit inhibitory impulses to the bladder. Richer, Learmonth, and others have shown that division of these fibers will "remove the brakes" and permit even a damaged bladder to empty itself if some sensation remains, and if no obstacle to urination exists (prostatic hypertrophy).

The first case is that of a boy of fourteen with a lifelong history of nocturnal enuresis and urinary frequency culminating two years before admission in an overflow incontinence. There was an associated spina bifida occulta but no evidence of a lesion of the

spinal cord, thus indicating that there was a lesion of the bladder nerves or ganglia, presumably in the form of a dysplasia or developmental anomaly. Since a six weeks' period of catheter drainage yielded no benefit, a presacral neurectomy was done and supplemented, because of advanced atrophy of the bladder wall, with a cystostomy. After the cystostomy had closed, the patient was taught to void at three-hourly intervals day and night. Eleven months after operation the residual urine was fifteen cubic centimeters; there was no incontinence except if he failed to get up and void during the night. On such occasions he usually wet the bed toward morning.

The second case is a male of twenty-five years who had an infectious myelitis in 1927, with anesthesia to the umbilicus, paraplegia, and urinary retention. These symptoms slowly disappeared except that the patient was unable to tell whether his bladder was full, and was incontinent almost daily.

Examination in November, 1933, showed hypesthesia below the level of distribution of the eleventh dorsal segment of the cord, 250 c.c. of residual urine, and cystoscopic evidence of neurogenic vesical dysfunction. Training and intermittent catheterization proving of no avail, presacral neurectomy was done. Postoperative use of the indwelling catheter resulted in an acute prostatitis and epididymitis, so that a cystostomy was done and maintained for six weeks. It was then allowed to close, and regular urination was instituted. The residual urine upon dismissal and six weeks later was fifteen and five cubic centimeters, respectively. There was no incontinence.

In conclusion I wish to emphasize that the successful use of presacral neurectomy in these cases depends, first, upon the presence of some remnant of sensation in the bladder; second, upon the provision of adequate bladder drainage in the postoperative period; and last, upon training the patient to remember that his bladder will always be abnormal so that he must empty it regularly, by the clock, both day and night, in order to prevent its redistention and the development of an irreparable atrophy of its muscular wall.

THE EMPLOYMENT OF CYCLOPROPANE ANESTHESIA

DR. RALPH T. KNIGHT: In October, 1933, at the Congress of Anesthetists at Chicago, Ralph Waters and his associates in anesthesia at the University of Wisconsin, gave the first comprehensive report of the clinical use of cyclopropane as an anesthetic gas. Their report was published in the March-April number of *Current Researches in Anesthesia and Analgesia*.

The following is a brief review of this report:

Cyclopropane is C_3H_6 , an isomer of propylene. It is given its name because of its cyclic structure, a three carbon ring, each carbon atom bound to each of its neighbors by a single bond and each carbon atom having two hydrogen atoms attached to it. As there are no double bonds it is much less explosive than ethylene, which is C_2H_4 , with the two carbons bound by a double bond. Cyclopropane is, however, explosive in concentrations between 20 per cent and 70 per cent with oxygen. It is not at all explosive below 20 per cent

with oxygen. As this concentration is seldom reached and is probably never necessary, the explosion hazard is practically negligible. Fourteen to 16 per cent in oxygen produces good deep anesthesia.

Henderson and Lucas, of the University of Toronto, in 1929, published a laboratory study of the anesthetic properties of cyclopropane. They gave a very favorable report and noted surprisingly few changes in general bodily metabolism.

Waters, et al., therefore began their work in August, 1930. They were assisted by Dr. M. H. Seevers of the Pharmacology Department and Professor W. J. Meek of the Physiology Department. Ten dogs were subjected to increasing degrees of anesthesia while taking electrocardiographic records. No significant changes were noted until severe respiratory depression was reached. Some were carried to complete apnea, once lasting to six minutes, with spontaneous recovery and without significant electrocardiographic evidence of heart damage.

Waters reported 447 clinical cases. Preliminary medication was the same as for other anesthetics. Failure to obtain complete relaxation when needed occurred only twice. Surgical anesthesia was obtained in five or six minutes. Recovery of consciousness required only the same length of time in most cases. The signs of anesthesia were the same as with ether except that eye signs of deep anesthesia did not develop as early. Respiratory signs were therefore even more paramount.

Waters, et al., conclude that:

- a. The gas was found satisfactory as an anesthetic agent, particularly since adequate muscular relaxation is obtained with concentrations of less than 20 per cent in oxygen.
- b. Laboratory experiments show it to have no more effect on vital functions than anesthetic agents now in common use.
- c. Technic of administration and signs of anesthesia differ somewhat from those of other agents.
- d. Post-operative complications compare favorably with those of other agents under similar conditions.
- e. The gas has no undesirable physical properties and although explosive, is less so than ethylene.
- f. Its use is still in the experimental stage and it should not be put into general use for another year.

We have begun the occasional use of cyclopropane and I am including in these very few cases those given at the Minneapolis General as well as those given at the University Hospital. The Minneapolis General Hospital sent me to Madison to observe the use of cyclopropane by Waters and his associates. I have given cyclopropane nineteen times for the following operations: thoracoplasties (2); tumors of the chest wall (2); resection of the pancreas and splenectomy (1); cholecystectomies (2); appendectomies (3); colostomy (1); salpingectomies with suspension of uterus (4); hernioplasty (1); colporrhaphy (1); amputation of foot (1); cast (1).

Cyclopropane was ideal for the chest cases because, with the limited ventilation possible, they were thoroughly oxygenated by the high concentration of oxygen

possible with this anesthetic. It was also ideal for all of the pelvic cases. Although two of them were nulliparas they were all perfectly relaxed by the cyclopropane alone. This was also true for the colostomy, hernia, colporrhaphy, amputation, and cast.

The patient who had the resection of the pancreas and splenectomy was a large, muscular young man of thirty, weighing over 190 pounds. Such an operation on such a patient is a severe test for any anesthetic. The line of incision was first infiltrated with novocaine. The operation lasted over two hours and the cyclopropane without ether gave sufficient relaxation throughout the entire procedure, including the closure. The novocaine was probably not necessary as none had to be added for the closure.

Of the two cholecystectomies, one required the addition of one-half ounce of ether for sufficient relaxation for the closure. Both were infiltrated with novocaine for the incision. The relaxation in both was entirely sufficient for the exploration and operative work.

Of the three appendectomies, one required nothing but the cyclopropane. One required the addition of ether to secure enough relaxation. The third was a cyclopropane failure. The patient became so rigid that the anesthetic was changed to ethylene and ether. This was one of the first trials and I know now that the failure was caused by too great concentration of cyclopropane during induction and too early incision. Even the chest became so rigid that artificial respiration had to be done. This was not due to over-anesthetization.

It is easy with cyclopropane to carry the anesthesia to cessation of respiration. There is a considerable margin of safety beyond this, however, as the patient is always so abundantly oxygenated that his color remains beautiful for several minutes without breathing. This happened twice in our small series and a few compressions of the gas bag caused the resumption of respiration. With a little experience in handling the gas, and with the realization that chest movement fades out before the diaphragm is affected and that the eye signs of deep anesthesia do not occur, the deep margin can be avoided. Some of the patients were nauseated and a few vomited immediately upon waking, but in none did this continue.

The advantages of cyclopropane are:

1. Relaxation can be accomplished which no other gas is capable of producing. Many abdominal operations can be performed without ether.
2. It is a very pleasant gas to take.
3. No toxic effect upon the organs has been demonstrated.
4. It is given in very low concentration, 10 to 20 per cent in high concentration of oxygen.

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AN EXPERIMENTAL STUDY IN THE PREVENTION OF INTRAPERITONEAL ADHESIVE FORMATION

DR. C. E. REA (by invitation): The purpose of this paper is to compare the value of certain substances in preventing peritoneal adhesions in rabbits.

The etiology and pathology of peritoneal adhesions have been so carefully described by Benjamin, Ochsner and Garside, and Warren that these features will not be discussed.

Methods to prevent postoperative adhesions have interested the surgeon since the beginning of aseptic surgery. In the comprehensive reviews of Kubota and Ochsner and Garside, it is surprising to note the number and variety of substances that have been used. Since the formation of adhesions is part of the normal process of repair, the problem is not so much that of prevention as one of limitation of the repair process during the healing stages. The means to limit postoperative adhesions may be divided into four classes:

1. The use of greasy or oily substances, as liquid paraffin, vaseline, or acacia, to cover the denuded peritoneal surfaces. Experimentally, however, these substances tend to increase rather than decrease adhesions (Ochsner and Garside).

2. The administration of drugs to augment intestinal activity during the immediate postoperative stage. Drugs like pituitrin, physostigmine, castor oil, and strychnine have been used. The fact that pericardial adhesions will develop in spite of the constant motion of the heart and the danger after certain operations of perforation of the gut due to too violent peristalsis casts much doubt on the efficacy of this form of treatment.

3. Introduction of dilute solutions of tissue digestants. Kubota in 1922 first used papain to prevent postoperative adhesions experimentally and reported favorable results. Ochsner and Garside found that if preexisting adhesions were divided in the peritoneal cavities of dogs and solutions of trypsin or papain introduced, few or no adhesions formed in 42.28 per cent and 90.89 per cent of cases respectively. Of sixteen rabbits which had trauma and iodine and papain solutions introduced intraperitoneally, 93.75 per cent developed few or no adhesions. The effective concentration of papain used was solutions of 1-50,000 to 1-100,000. Papain is more effective than trypsin as the latter is inactivated within two hours when placed in the peritoneal cavity.

4. The use of fluids slowly absorbed from the peritoneal cavity with a view to separate mechanically the loops of bowel. Trusler, Johnson and Warren reported very favorable results with amniotic fluid. The last two authors found that adhesions were prevented experimentally in over 80 per cent of cases. The mechanism of the action of amniotic fluid has been interpreted differently by various writers. Johnson describes its action to an immediate production of a protective layer of fibrin with an accompanying moderate leukocytosis. Permanent adhesions are prevented by the rapid resolution of the exudate by the proteolytic

ferments of the leukocytes. Warren believes that amniotic fluid decreases oozing from the tissues, which lessens the amount of blood and fibrin, and therefore lessens the probability of adhesions. Also he states the fluid is absorbed slowly and acts as a lubricant between eroded surfaces. Trusler believes that it stimulates the peritoneum to a more powerful defensive reaction and stimulates a more rapid proliferation of endothelial cells. Lacey could not duplicate Warren and Johnson's results but concluded that, while amniotic fluid could not be depended upon to prevent adhesions, it was harmless when introduced into the peritoneal cavity, and possibly did lessen the density of the adhesions.

Saline, sodium citrate, air, defibrinated blood, hypertonic glucose, blood serum, and ether, are some of the other substances that have been used. Saline and sodium citrate are probably absorbed too quickly to be of much value. Ochsner and Garside found saline to be effective in preventing adhesions in 13.32 per cent of experimental cases. The danger in using hypertonic glucose is not only that it is an excellent culture medium, but also tends to dehydrate the patient. Defibrinated blood and blood serum are also good culture media and there is the possibility that thrombokinase liberated from the injured endothelial cells may clot the defibrinated blood; the clot will then be organized, increasing instead of decreasing the number of adhesions. Air and ether have been little used. Too much ether will tend to increase the narcosis, perhaps dangerously so; too little ether will probably evaporate before the abdomen is closed.

In this study the following substances were compared with regard to their relative effectiveness in preventing peritoneal adhesions in rabbits; defibrinated ox blood, defibrinated rabbit blood, amniotic fluid (dog), amfetin,* sodium ricinoleate (1 per cent), air, air and amfetin, air and sodium ricinoleate (1 per cent), blood serum of the dog, ether, hypertonic glucose, normal saline, papain 1-50,000. The solutions were sterile and 20 c.c. were used unless otherwise stated. About ten rabbits were used in each series. In the four best series the effectiveness of the substance was studied in another ten rabbits, making a total of twenty animals in these series.

To produce adhesions, the following method was used: the peritoneum and intestines were roughened by scraping with a knife or rubbing with gauze, and the raw surfaces painted with tincture of iodine. The amount of iodine applied is empirical but is important with regard to operative mortality. In twelve animals so treated (controls), two died from the procedure, and of the ten surviving, nine developed peritoneal adhesions (90 per cent).

Animals were allowed to live one week before being killed and the peritoneal reaction studied. Adhesions were graded as slight, medium, or dense. The substances to prevent adhesions were introduced into the peritoneal cavity after the iodine was applied.

The four substances that were most effective in preventing adhesions in this study were: sodium ricinoleate

*Lilly's trade name for amniotic fluid.

(1 per cent), 85 per cent; papain 1-50,000, 75 per cent; amfetin, 70 per cent; defibrinated rabbit's blood, 65 per cent.

Sodium ricinoleate, or castor oil soap, not only prevented adhesion most often, but has the added advantage of acting in either a sterile or infected peritoneum. Ochsner and Garside demonstrated that papain and trypsin are inactive in the presence of infection. Its action on bacteria is a surface tension phenomenon; it destroys the cell membrane of the bacteria (Larson). While *B. coli* and *Cl. welchii* will grow in sodium ricinoleate, papain, amfetin, and defibrinated blood, they are rendered nonpathogenic by sodium ricinoleate. Its action in preventing adhesions, except for its effect in limiting bacterial growth, is not clear. The manner in which it works is more than by just mechanical separation of the bowel, for in rabbits most of it is absorbed within one hour (*B. Olson*). Studies on the peritoneal fluid of rabbits using supravital staining methods (neutral red) would suggest that half the histiocytes are either killed or injured by the sodium ricinoleate, judging from the amount of dye in these cells. Thus, sodium ricinoleate may destroy the cell membrane of the histiocytes as well as bacteria, thereby limiting the repair process. It emulsifies fibrin *in vitro*; papain actually digests fibrin, while amfetin and defibrinated rabbits blood have no effect.

Cultures were taken from the peritoneal cavity before and after the adhesions were produced. It is interesting that some type of bacterial growth was cultured from the peritoneum in approximately half (forty-two out of seventy-nine) of apparently normal rabbits before the trauma and iodine were applied. The technic was checked by members of the Departments of Surgery and Bacteriology and no errors could be detected. Controls were taken routinely from the applicators and media. For the most part the growths were mixed cultures of Gram-positive and -negative rods and cocci; *B. coli* was never found. For want of a better explanation these positive cultures are considered contaminations. At death all cultures of the peritoneal cavity showed some growth; 20 per cent of the cultures showed *B. coli* and 15 per cent *Cl. welchii*. However, in three of the nine cultures taken from rabbits that had received sodium ricinoleate, there was no demonstrable growth, and one of these had shown a positive culture of mixed organisms before operation.

Clinical experiences with the above substances are limited. Johnson used amniotic fluid in sixty-five cases of cesarean section and 30 clean laparotomies and reported favorable clinical results. Ochsner and Garside used papain and trypsin in fourteen clinical cases but the time of observation was too short to judge the end-results. It is the practice of this hospital when sodium ricinoleate is used to put 60 c.c. in the peritoneal cavity. Our clinical results with it, amniotic fluid, and papain are too meager to draw conclusions. However, since in this study sodium ricinoleate was more effective than the latter two drugs in preventing peritoneal adhesions in rabbits, its further clinical use would seem warranted.

PERSONAL EXPERIENCES WITH SPLENECTOMY

DR. OWEN H. WANGENSTEEN: The Ancients spoke of the spleen as being full of mystery. Pliny, the elder, in his "Natural History" stated that the spleen "had a property to hinder man's running," and thought that the spleen probably removed melancholy from the blood, and believed that "those possessed of intemperate laughter always had great spleens." Shakespeare was not unaware of these attributes of the spleen, for in "Twelfth Night," Maria as she ridicules the feigned mirth of Malvolio before Sir Toby says, "If you desire the spleen and will laugh yourself into stitches, follow me."

Richard Burton in his "Anatomy of Melancholy" denominated the spleen as the source of hypochondriacal melancholy, which impression is more in accord with the modern version that anger, ill-humor, malice, and spite may be given vent from the spleen.

Functions of the Spleen: The functions of the spleen have to this day resisted full understanding. We know that its removal is compatible with good health. Recent investigations by physiologists have shown that in the dog, at least, it is perhaps the most erectile tissue in the body, capable of enormous alterations in size. The spleen is the dominant organ of the reticulo-endothelial system. It frequently participates in diseases of the blood, lymph nodes, and liver. Enlargement of the spleen in acute and chronic infections and toxic conditions is a not infrequent event. Correlation of pathologic alterations in the spleen with clinical syndromes for which the diseased spleen may be responsible yet remain to be established. The diseased spleen gives rise to a variety of disorders of health, some of which may be effectually terminated by excision of the spleen.

Indications for Splenectomy.—The diseases of the spleen which are most amenable to cure by splenectomy are (1) hemolytic icterus, (2) purpura hemorrhagica, and (3) Banti's disease or splenic anemia. Rupture of the spleen with immediate or delayed hemorrhage, cysts, hydatid and non-parasitic, as well as benign and isolated malignant tumors of the spleen occasionally compel its excision. The spleen has been excised with success for aneurysm of the splenic artery and improvement has followed its excision in primary tuberculosis of the spleen as well as for the stubborn anemia of syphilis occasionally attended by unusual splenomegaly. Roentgen treatment has supplanted splenectomy as a palliative measure in the leukemias. Excision of the spleen in polycythemia and cirrhosis of the liver would no longer appear to be justified.

Technic of Splenectomy.—The spleen may be excised under inhalation or spinal anesthesia. My own preference, unless some complicating condition contradicts its administration, is ethylene supplemented with ether. In the eleven splenectomies which I have done, spinal anesthesia was employed almost as frequently as inhalation anesthesia, and in most instances with complete satisfaction. In two cases, however, in which the spleen was adherent to the diaphragm, discomfort and nausea were provoked, necessitating reinforcement with ethylene. A transverse subcostal or left rectus

incision may be employed. My own preference is for the rectus incision with a horizontal extension of the incision to the left when the spleen is large and the exposure is inadequate.

Balfour's* lucid and beautifully illustrated article on the technic of splenectomy has become the standard guide for the excision of this organ. The ease or difficulty of excision of a pedicled organ depends largely upon how readily it may be mobilized. It is essentially the lienorenal ligament that tethers the spleen, aside from abnormal adhesions which may occasionally be present. It has been my experience that the division of this ligament on the postero-lateral aspect of the spleen permits of its dislocation upon the abdominal wall. It is a good plan to divide the gastrosplenic omentum in which course the vasa brevia before the spleen is mobilized. Then, when the spleen is lifted up onto the abdominal wall, the splenic vessels alone remain to be dealt with. Whenever possible, especially in large spleens, ligation of the artery before the veins permits of saving the patient blood. Six years ago, I first employed division of the lienorenal ligament to mobilize the spleen. Previous to that time, the delivery of a large spleen had been much of a wrestle for me. Inasmuch as these patients frequently have discomfort from distention, it is a good plan to apply suction to an inlying duodenal tube to prophylactically prevent its occurrence. The patient may be sent to the operating room with the tube in place. Should there be any gaseous distension of the stomach, suction can be employed during the operative procedure.

Complications from Splenectomy.—The only serious complication observed in these eleven cases was an unusual shock coming on about ten hours after splenectomy for Banti's disease in a patient (Mrs. A. V.) in whom the operative blood loss had been minimal. Hemopneumothorax with displacement of the mediastinum was present. The removal of the blood and air from the left thorax served to relieve the shock, but mild negative pressure had to be maintained by suction to combat the broncho-pulmonary fistula. The patient later developed an empyema which cleared up with rib resection. In this patient, dense adhesions between the diaphragm and the spleen were present. In arresting the bleeding from one of these adhesions the diaphragm was pulled upon, and in turn probably the pulmonary ligament, with an ensuing small tear in the lung. One patient in the group developed an incisional hernia which was subsequently successfully repaired.

Results of Splenectomy.—There was one hospital death in this series. A young girl (V. H.), aged 12, with a fairly typical picture of purpura hemorrhagica was operated upon for the removal of her spleen, which weighed only 143 grams. The platelet count which had been 83,000 prior to operation mounted to 400,000 with corresponding improvement in the bleeding time. Twelve days after operation, despite a number of transfusions (11 in all) the patient died with diffuse hemorrhage throughout both lungs and the intestinal canal.

Interesting postmortem findings were the absence of ovarian tissue and the presence of a congenital defect of the aorta.

Eight years ago a patient operated upon here by the late Dr. Law had a similar fatal outcome from persistent bleeding despite a number of transfusions after splenectomy for typical thrombocytopenic purpura.

Two other patients in this group of eleven had splenectomy for purpura hemorrhagica and have remained well.

Splenectomy was done twice for hemolytic icterus. Both patients apparently have been cured of their anemia and jaundice by the removal of their spleens, though in both instances there has been persistence of abnormal fragility of the red cells and a microcytosis. The largest spleen removed in this series was from one of these two patients with hemolytic icterus, the spleen weighing 1,720 grams. It contained in addition 350 grams of blood which came out after removal of the ligature on the veins despite preliminary ligation of the artery. Two accessory spleens the size of hazel and walnuts respectively were also removed. Failure to excise a spleneculus may be followed by marked enlargement of these small accessory bodies.*

In four patients the spleen was removed because of Banti's splenic anemia. All have remained well, though two have had subsequent hemorrhages. One patient (Mrs. M. B.), aged twenty, whose spleen was removed five years ago had two gastric hemorrhages in the year following, but she has been quite well since. M. E., a girl of eight, operated upon three years ago, whose removed spleen weighed 350 grams, had a moderate intestinal hemorrhage last summer.

In two patients I removed the spleen for cirrhosis of the liver six years ago, doing a Talma-Morison omentopexy at the same time. The splenectomy was done with the thought in mind that if the removal of an enlarged spleen in Banti's anemia would obviate the development of cirrhosis of the liver its removal in cirrhosis (in which condition the spleen possibly played an etiologic role) might serve to inhibit further progress of the disease. Since the appearance of the paper of Rowntree, Snell and Chapman and the thesis of Henrickson, one can readily appreciate that there is little justification for such optimism. One of these patients died two years later with typical clinical evidence of liver insufficiency; the other is still alive and well. A brother of this latter patient has subsequently developed a cirrhosis and has done equally as well on medical management.

Comment.—The best results in excision of the diseased spleen are to be observed in hemolytic icterus. The anemia and jaundice are cured by splenectomy even though the abnormal fragility of the red blood cells and the microcytosis persists. The next best results are to be obtained in early instances of splenic anemia before cirrhosis has developed. Occasionally, however, even in the ascitic stage, splenectomy is followed by cure as in the instance of the case reported by H. B. Sweetser, Sr.† As a group, however, the re-

*Surg., Gynec. and Obst., 23:1, 1926.

†Eccles & Freer: Brit. Med. Jour., 2:515, 1921.
§Surg., Gynec. and Obst., 33:201, 1921.

sults in true purpura hemorrhagica are better than in the whole group of cases catalogued as Banti's splenic anemia. A few patients with thrombocytopenic purpura die of hemorrhage despite excision of the spleen. In such instances the spleen is probably only a part of the mechanism which serves to destroy the platelets. Excision of the spleen should be done wherever feasible in a non-bleeding phase, for the risk of splenectomy as indicated by a number of operative series† is high when splenectomy is done for acute purpura. Kaznelson's advocacy of splenectomy for purpura‡ on the assumption that the spleen was destroying the blood platelets is a brilliant example of the success in medicine of the empirical method supported by critical observation and good rationalization. The customary lag in the acceptance of new methods encountered no exception in this instance, for it was almost seven years (1923) before the first splenectomy was done for purpura hemorrhagica in America.

Discussion

DR. E. A. REGNIER: The diagnosis of thrombocytopenic purpura is oftentimes very difficult. The differential diagnosis must be made between real purpura and aplastic anemias and so-called aleukemic leukemia. I recall a case of a child that had been studied on the pediatric service at Minneapolis General Hospital for a period of four weeks by the pediatric staff. The child had numerous transfusions. The body was covered with purpuric spots and the child was bleeding from the gums. The spleen was markedly enlarged. After numerous blood studies, including consultation with Dr. Downey, a diagnosis of thrombocytopenic purpura was arrived at. I removed the child's spleen. The operation was not difficult. The patient did well for forty-eight hours. The platelet count rose rapidly only to drop again after forty-eight hours. At that time the child again began to hemorrhage from the gums and numerous transfusions kept him alive for two weeks. It was not until tissues from the autopsy were checked that a diagnosis of aleukemic leukemia was made. Many of the blood dyscrasias show purpuric tendencies and the differential diagnosis is oftentimes extremely difficult.

DR. MARTIN NORDLAND: I want to call attention to one point in the technic of splenectomy which Dr. Wangenstein referred to, and that is, the importance of applying a ligature to the artery before applying the ligature to the vein. In many cases where this operation is indicated the patient is anemic. By applying the ligature to the artery first and then allowing a little time for the spleen to empty itself through the vein, much blood is conserved for the patient.

Splenectomy is usually well tolerated by the average patient. I recently repaired a large diaphragmatic hernia and in mobilizing the contents of the hernia the spleen was injured to such an extent that I found it necessary to remove it. The patient made a very nice recovery.

DR. IVAR SIVERTSEN: In the cases of so-called congenital splenic disease (hemolytic jaundice), I think a transverse incision in the upper abdomen is very valuable inasmuch as you frequently find gallbladder disease or gallstones present and when these are present you can remove the spleen as well as the gallbladder. I have seen several cases of this kind.

There is one other thing which was not mentioned, the question of secondary hemorrhage coming on after cases of splenectomy. This is a very dangerous condition and a hemorrhage of this type may come on as late as two weeks following the operation.

DR. OWEN H. WANGENSTEEN: The difficulty of always definitely ascertaining whether we are dealing with true purpura hemorrhagica is apparent from what has been said. At times in a fatal hemorrhagic dyscrasia, we hear reverberations of discussion from pathologists long after the patient is dead as to the exact nature of the disease which caused his death. It is immediately apparent, therefore, that the clinician with more limited means of examination at his disposal than the pathologist may have difficulty at times in adequately differentiating purpura hemorrhagica from secondary purpura, aplastic anemia, or aleukemic leukemia. If the surgeon will refrain from operating whenever possible in the acute phase of purpura, he will not often fall into error. However, patients may bleed to death despite all conservative agents which one can muster to combat the bleeding of thrombocytopenic purpura. Two patients with purpura hemorrhagica have died in this hospital of cerebral hemorrhage while under medical observation and treatment for bleeding. One can not, therefore, despite the admittedly high mortality of splenectomy in the acute phase, categorically say that he will not operate for acute purpura.

Dr. Nordland spoke of excision of the spleen as an adjunct measure in the course of other operations. In two types of operative procedure, I have found it necessary to excise the spleen as a means to facilitate surgical approach, viz., in total gastrectomy for cancer and in the excision of a tumor of the distal end of the pancreas for hyperinsulinism. I have had one successful total gastrectomy which necessitated excision of the spleen. An interesting observation in his case was that his hunger sensations and pangs were in every particular similar to those which he experienced before the stomach was excised. The patient with the adenoma of the pancreas was recently operated upon, and is still in the hospital. The spleen was excised to render easier the identification and excision of a small tumor on the dorsal aspect of the distal third of the pancreas. His blood sugar, which had been persistently low (15 to 50 mgm. per 100 c.c.) before operation, despite a large number of daily feedings, has hovered about the upper limit of normal since operation and the patient is convalescing nicely.

In addition to avoiding injury to the stomach in splenectomy, one takes great care not to include the tail of the pancreas in the ligature. The experience of a number of surgeons in excising the tail of the pancreas for hyperinsulinism would indicate that when

†Whipple: Surg., Gynec. and Obst., 42:329, 1926. Anschütz: Beitr. z. klin. Chir., 142:1, 1928.

‡Wien. klin. Wchnschr., 29:1451, 1916.

the stump of the pancreas is properly covered by omentum it is a fairly safe procedure.

The other indication for which it may be necessary to excise the spleen in the course of another operation is traumatic diaphragmatic hernia. I once saw the late Professor Küttner of Breslau employ the spleen as a plug to help close the rent in the diaphragm after repositing a large portion of the herniated abdominal content from the thorax back into the abdomen.

In some of the first splenectomies done by Sir Spencer Wells, mention is made of the danger of secondary hemorrhage. It is my impression that these were probably due to mass ligation of the splenic pedicle. If the spleen is well mobilized so that ligatures may be placed on the individual vessels in the splenic pedicle, without the employment of the commonly practised three-clamp technic, I believe that secondary hemorrhage would be most unlikely. In my experience it has never been necessary to leave a pack in the wound to control bleeding or to leave clamps on the splenic vessels. It is my impression that in the splenomegaly of Banti's anemia one is more likely to encounter trouble with vascularized adhesions to the diaphragm than in any other splenic enlargement. My experience with such a case is cited in the paper.

As far as the incision in the abdominal wall is concerned, I believe one might use any of the commonly employed incisions with complete satisfaction. Patients with hemolytic icterus, as Dr. Sivertsen pointed out, frequently have gallstones. My preference, however, would be to deal with the gallbladder secondarily. I do not believe it wise to contemplate any other major surgery during the course of splenectomy for splenomegaly. Dr. Archa Wilcox of this city successfully removed the spleen in an infant of fifteen months for hemolytic icterus, the youngest on record, I believe.

The problem in diagnosis which would present itself in a patient with hemolytic icterus having also a stone in the common duct would be a real one; for we are all wont to feel that the distinguishing feature of the jaundice of hemolytic icterus is that these patients have no bilirubin in the urine despite an occasionally rather high value for bile pigment in the blood. The increased fragility of the red blood cells, however, should serve to differentiate. In a patient who had had the spleen removed by Sir Spencer Wells in 1887, Lord Dawson, in 1914, still found the red cells abnormally fragile in the patient. Spencer Wells had pioneered here too, before the signposts marked the way; for it was only in 1907 that Chauffard pointed out the abnormal fragility as the characteristic finding in the jaundice of congenital hemolytic icterus, and it was not until 1912 that Banti and Eppinger independently urged splenectomy as a curative measure for the condition.

The blood destruction in the hemolytic crisis of hemolytic icterus is often startling. The boy with the 1,720 gram spleen had a crisis on the day on which he was first scheduled for operation. His hemoglobin on entry was 55, and he was given 600 c.c. of blood without reaction on the day prior to scheduled operation. The temperature rose to 104.4° F.; operation was postponed and the next day the hemoglobin was

45. Two weeks later, he was readmitted for splenectomy and, under the sole influence of the aid so often invoked by Ambrose Paré, the hemoglobin was found to have risen to 78.

DR. KENNETH BULKLEY: Dr. Nordland, it has been my privilege, for a period of two years, to serve as President of the Minneapolis Surgical Society. The duties which this position has imposed upon me have always been a pleasure and I wish to take this opportunity to express my gratitude to the members of the Society, to its Executive Committee, and to its highly competent and able Secretary, Dr. Olson, for the splendid coöperation which has contributed so largely to whatever success the Society has attained during the period of my incumbency.

One further duty rests upon me and in order to fulfill it I have asked Dr. Maxeiner and Dr. Olson to at this time escort you to the rostrum.

Dr. Nordland, I take great pleasure in handing you herewith, as badges of your office, two objects. As I give them into your charge may I wish you all success in your tenure of office as President and assure you that as a member of your Executive Committee for this coming year I will do all in my power to help you make this Society continuously successful. I first hand you the Presidential portfolio. And now, in turning over to you the Presidency, may I present you with this gavel, the symbol of your authority over us for the coming year. Congratulations!

DR. MARTIN NORDLAND: Dr. Bulkley and members of the Minneapolis Surgical Society: On this occasion I wish to express my sincere appreciation of the honor the Society has bestowed upon me in electing me President of this organization. Since my election to membership in 1923, I have considered it a privilege to attend and take part in the meetings. I feel that the Society has done much for me. It has been interesting to watch the progress of this organization. I believe that you will agree with me that the Society has assumed a position of unusual importance in the Twin Cities and in the State. During its development many of our illustrious members have been Presidents of this organization and to them should be given the credit for its marvelous development.

I feel that it will be particularly difficult to follow in the footsteps of such an efficient leader as we have just had in Dr. Bulkley and I feel that it will not be easy to "fill his shoes."

I realize that it is a privilege of the President to call upon other officers of the organization to assist him in the duties he must perform. It is my good fortune to inherit, as my first lieutenant for the coming year, our very industrious secretary and treasurer, Dr. Fred Olson. With his help I already have a good start.

I want you all to know I feel very highly honored to be elected to this position and I will do my best to make this year a success.

I thank you.

Respectfully submitted,

F. A. OLSON, M.D.,
Secretary and Treasurer.

Of General Interest

Dr. Roy F. Raiter, of the firm of Drs. Raiter & Raiter, Cloquet, Minnesota, sailed on July 28 for Vienna, Austria, where he will take a three months' post-graduate course in surgery.

Two Minneapolis physicians appeared on the program of the North District Medical Society of Wisconsin at their meeting held August 15, 1934, at Pine Crest Lodge. Dr. J. K. Anderson read a paper on "Ischio-rectal Abscess" and Dr. M. O. Henry presented the subject "Supra-condylar Fractures of the Elbow."

Dr. Harry Lee Parker has resigned his post as Associate Professor of Neurology in The Mayo Foundation and consulting physician in the Section of Neurology of The Mayo Clinic to return to Ireland where he has been appointed Chief of Staff of the Neurologic Institute of Southern Ireland and Professor of Neurology, Trinity College, University of Dublin. Dr. Parker is a graduate of the University of Dublin and came to the Mayo Foundation in 1919.

SIXTH ANNUAL MEDICO-MILITARY SYMPOSIUM, THE MAYO CLINIC

The 1934 Medico-Military Symposium for Medical Department Reserve Officers of the Army and Navy will be held at the Mayo Clinic, from October 7 to 20, both dates inclusive.

This is the Sixth Annual Inactive Duty Training Course to be held at The Mayo Clinic and will follow the plan which has proven so satisfactory in past years; the morning hours will be devoted to attending clinics on subjects selected by the student officers, and the afternoon and evening hours given over to work in Medico-Military subjects. The Medico-Military Program will be under the personal supervision of Colonel Kent Nelson, M.C., U. S. Army, Corps Area Surgeon, Seventh Corps Area, and Captain J. B. Mears, M.C., U. S. Navy, District Medical Officer, Ninth Naval District.

The staff and faculty of The Mayo Clinic have placed their unexcelled facilities at the service of their Government in the interest of preparedness and have extended an invitation to all the service to participate. The two weeks' excellent clinical post-graduate work must make a definite appeal to all who are interested in their profession and does not incur as great a loss of time for the private practitioner that normally pertains to post graduate work along professional lines.

Application for this course of Inactive Duty Training should be made either to the Corps Areas Surgeon, Seventh Corps Area, Omaha, Nebraska, or to the District Medical Officer, Ninth Naval District, Great Lakes, Illinois. Applications should state the character of the work the candidate desires to follow in the morning hours. All student officers are expected to attend and participate in the afternoon and evening sessions. Each applicant should fully understand that the invitation to accept this course of study without charge is extended by the Mayo Clinic; that the project is without expense to the Government; and that one hundred hours' credit will be given those who take and complete the course. While it is desirable to attend the entire course, those whose time will not permit this may join or leave at any time and will receive credit for the hours spent in training. Uniforms are optional.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

Medical Broadcast for the Month

The Minnesota State Medical Association Morning Health Service.

The Minnesota State Medical Association broadcasts weekly at 11:00 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of September will be as follows:

- September 5—Athlete's Heart.
- September 12—Encephalitis.
- September 19—Back in School.
- September 26—Progress in Cancer Control.

Interstate Postgraduate Medical Association

The International Assembly of the Inter-State Postgraduate Medical Association of North America will be held in the Public Auditorium, Philadelphia, Pennsylvania, November 5-9, 1934. Many distinguished teachers and clinicians will appear on the program. A major list of the names of the contributors to the program, with other information, appears on page xvi of this journal. All members of the Minnesota State Medical Association are cordially invited to attend. Registration fee of \$5.00 admits all members of the profession in good standing.

Invitation to Wisconsin

Meeting at Green Bay on Wednesday, Thursday and Friday, September 12 to 14, the State Medical Society of Wisconsin extends a very cordial invitation to members in adjoining states vacationing in Wisconsin to be guests at its 93rd Anniversary Meeting. All sessions will be held in the Columbus Community Club, Green Bay.

Morning sessions will be devoted to section meetings and clinical presentations with general sessions each afternoon. The President's Address will be given at a smoker Wednesday evening, September 12, while Drs. Olin West, secretary of the American Medical Association, and Dean Dewis, Baltimore, will address the annual dinner on Thursday evening.

Northern Minnesota Medical Association

The Northern Minnesota Medical Association will hold its annual meeting at Brainerd, Minnesota, September 10 and 11, 1934.

This year the Association is being directed by the following officers: Dr. A. C. Baker, Fergus Falls, president; Dr. J. F. Du Bois, Sauk Center, vice president, and Dr. O. O. Larsen, secretary-treasurer.

At the banquet Monday evening, Dr. Scammon will act as toastmaster. Addresses will be given by Professor A. E. Jenks of the University of Minnesota on "Minnesota Man," by Dr. A. C. Baker, president of the Association, and by Dr. F. J. Savage, president of the Minnesota State Medical Association.

The following interesting program has been arranged by the committee, of which Dr. F. J. Hirschboeck is chairman:

ADDRESSES

- Fractures: Diagnosis and Treatment in Rural Practice.
H. H. Leibold, Parkers Prairie.
- Endocrine Growth and Sex Deficiency.
L. F. Hawkinson, Brainerd.
- The Present Status of Dinitrophenol.
Edgar T. Herrmann, Saint Paul.
- The Cost of Medical Liability Insurance.
B. J. Branton, Willmar.
- Malpractice.
W. H. Hengstler, Saint Paul.
- Idiopathic Hypochromic Anemia.
Samuel H. Boyer, Jr., Duluth.
- The Diagnosis and Management of Anemia.
J. B. Carey, Minneapolis.
- Malignant Tumors Arising from Epithelioma of the Pharynx.
W. T. Peyton, University of Minnesota.
- The Treatment of Infertility Associated with Hypometabolism.
C. A. McKinlay, University of Minnesota.
- The Jaundiced Patient.
O. J. Hagen, Moorhead.
- Report of the Meeting of the American Heart Association.
Robert S. Nelson, Duluth.
- Osteitis Fibrosa Cystica.
E. N. Peterson, Eveleth.
- The Diagnosis and Treatment of the Various Types of Goiter.
E. H. Rynearson, Mayo Clinic, Rochester.
- Cerebral Arteriosclerosis.
E. M. Hammes, Saint Paul.
- Recent Therapeutic Advances in Neurology.
J. C. Michaels, Minneapolis.
- Non-organic Causes of Fatigue.
Norman Johnson, Minneapolis.
- The Prevention of Complications of Prostate Resection.
Gershom Thompson, Mayo Clinic, Rochester.
- Recent Progress in Therapy of Heart Disease.
Morris Nathanson, Minneapolis.
- Urography with Special Reference to Differential Diagnosis in Kidney Conditions.
Edward Bratrud, Thief River Falls.
- Subject not announced.
F. J. Hirschboeck, Duluth.

Examiners for the Sixteenth Judicial District. The latter position he held by reappointment for two terms.

In 1883, Dr. Routh, mainly on account of the ill health of his wife and himself, moved to Saint Paul, where he resided to the time of his death. He was first associated with his brother Dr. J. W. Routh, who died in 1886, and later with another brother, Dr. W. W. Routh.

Six years ago Dr. Routh was forced to retire from active practice on account of ill health and died July 23, 1934, on his eighty-seventh birthday.

Edward P. Seguin
1873-1934

Dr. Edward P. Seguin of Eveleth, Minnesota, died May 3, 1934.

Dr. Seguin was born at St. Hyacinthe in the province of Quebec, September 13, 1873. He graduated from the medical department of Laval University in 1899 and was licensed to practice medicine in Minnesota in 1900. Dr. Seguin began practice at Pierz, Minnesota, in 1900 and moved to Bovey in 1912. From there he went to Eveleth in 1925. He served as Assistant County Health Officer for Itasca County for six years and later was Health Officer of Eveleth from 1928 to 1930 and again in 1934.

Dr. Seguin was one of the old school practitioners who in the early years of this century experienced the hardships of frontier practice. His patience, charity and unassuming manners endeared him to his patients and friends. He is survived by his wife, six daughters and four sons.

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

Books Received for Review

THE SINISTER SHEPHERD. A translation of Giralamo Fracastoro's Syphilidis Sive de Morbo Gallico Libri Tres, by William van Wyck. 85 pages. Illus. Price, cloth, \$4.50. Los Angeles: The Primavera Press, 1934.

THE LABORATORY METHOD IN TEACHING PHYSICAL DIAGNOSIS AND CLINICAL HISTORY RECORDING. Logan Clendening, M.D. 72 pages. \$0.50. St. Louis: C. V. Mosby Company, 1934.

THE SPASTIC CHILD. Marguerite K. Fischel. With Introduction by George Gellhorn, M.D. 98 pages. Cloth, \$1.50. St. Louis: C. V. Mosby Company, 1934.

MEDICINE MARCHES ON. Edward Podolsky, M.D. 344 pages. 1 illus. Cloth, \$3.50. New York and London: Harper and Brothers, 1934.

MATERNAL MORTALITY IN FIFTEEN STATES. United States Department of Labor, Children's Bureau, Publication No. 223. Washington: Government Printing Office, 1934.

THE POWER TO LOVE. Edwin W. Hirsch, B.S., M.D. Associate in Urology, College of Medicine, University of Illinois. 363 pages. Illus. Price, cloth, \$4.00. New York: Alfred A. Knopf, 1934.

OBITUARY

George Edward Routh
1847-1934

Dr. George E. Routh of Saint Paul was born in Cincinnati, Ohio, July 23, 1847, the son of Dr. J. W. Routh, a surgeon in the Union Army, who during the War of the Rebellion was post surgeon at Milliken's Bend, Louisiana, on the Mississippi above Vicksburg. His father died in service in 1865 and the care of the family fell mainly on the shoulders of the subject of this sketch.

Dr. Routh's early life was spent in his native state. After receiving his scholastic education, which was obtained in the public schools, he took a full course of medical instruction at the Miami Medical College, Cincinnati, graduating in 1874. Subsequently he took a private clinical course with Professor Carson of Cincinnati, in the hospital wards of that city, making special study and investigation of the subject of the diseases of the throat and lungs. Afterward he engaged for a year in the general practice of his profession in the State of Illinois, and then moved to Austin, Texas, where he was located for several years. He was a member of the Board of Health of the city of Austin, and was appointed a member of the Board of Medical

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SOME COMMENTS ON MORTALITY AND MORBIDITY TRENDS*

HENRY W. COOK, M.D.

Minneapolis

ONE of the most pertinent of the many criticisms aimed at modern civilization, especially of the past half century, is the universal concentration and absorption of interest in immediate results without due regard to the longer vision, and to this have been attributed the major mistakes of our industrial and economic system, and in large part the present crisis. The succession of five-year plans in Russia, the careful planning of Mussolini, and the recent suggestion of a fifty-year plan by Mr. Roosevelt, show the trends of the world-wide "New Deal" as opposed to day by day expediency. To a civilization probably in its infancy in relation to the centuries ahead, this could hardly have been otherwise. The amazingly rapid acquisition of such fascinating toys as the steamboat, automobile, radio, aeroplane, and the other marvels of our machine age, and their mass production, have diverted human interest from a broader philosophical viewpoint, and, as has been said, we have been too busy living to have really lived in a higher or truer sense. H. G. Wells likens modern science to a rich uncle who has brought to the nursery more toys than the children know what to do with. The vigorous lines of a modern poet, Robinson Jeffers, indict science:

"Man, introverted man, having crossed
In passage and but a little with the nature of things this
latter century,
Has begot giants; but being taken up
Like a maniac with self-love and inward conflicts cannot manage his hybrids.
Being used to deal with edgeless dreams,
Now he's bred knives on nature, turns them also inward;
they have thirsty points though.
His mind forebodes his own destruction;

Actæon who saw the goddess naked among leaves and
his hounds tore him.

A little knowledge, a pebble from the shingle,
A drop from the ocean: who would have dreamed this
infinitely little too much?"

That scientific conquest and production must be planned and controlled from a longer viewpoint to forestall descent, perhaps, into complete anarchy has required dictatorships in Russia, Italy, Austria, and Germany, an incipient revolution in France, and a virtual dictatorship in the United States. Concentration of physical, mental, and spiritual life to material acquisition or pecuniary gain, so characteristic of our present phase of civilization, inevitably ends in progressive atrophy and degeneration.

We of the oldest profession, rooted and drawing nourishment, even if often in attenuated form, from the most ancient cultures, have escaped many of the more pernicious ills of the industrial age, and while we may not have enjoyed all its luxuries, extravagances, and material rewards, we have, we flatter ourselves, handed down, moderately inviolate, many of our ancient humanitarian, philosophical, and spiritual inheritances. Even medicine, however, cannot be expected to have escaped the extravagances and errors of judgment that are perfectly understandable as an inevitable accompaniment of the breath-taking discoveries that followed so rapidly one upon another during the past five decades. The modern medical student and practitioner has had crowding upon him such a complicated and kaleidoscopic maze of discoveries in chemical, physical, and biological fields that it has been almost necessary that his attention should have been monopolized by technic and material methods, and that the philosophical insight with which

*Thesis presented before the Minnesota Academy of Medicine, March 14, 1934.

early medicine was so intimately related, should be partly sidetracked and wisdom often sacrificed to knowledge. A review of the successive medical fads and obsessions which have dominated medical practice during these recent hectic decades does not engender entire complacency. Venesection antedates the modern era, but it was followed by oöphorectomies for every female abdominal discomfort, by the extravagances of glandular therapy, of fresh air as a cure-all, of light therapy, shot-gun vaccines, tonsillectomies, etc. Venesection, once the universal treatment, is now seldom practiced, and oöphorectomies are carefully considered, but an eminent medical authority not long ago stated that the medical profession would one day be as ashamed of the modern universal tonsillectomy as we are now ashamed of the venesection and oöphorectomies of the past generations.

Everett Dean Martin has said, "Modern life is concerned chiefly with immediate results; thinking is subordinated to doing." The modern mother who has a child underweight, or in her opinion under par mentally or physically, is not satisfied until some physician has told her a tonsillectomy is indicated and performs the operation. She wants something radical done to bring her child to the weight, size, or mental alertness of her neighbor's child, or of her own ideal of what her child should be, although the condition may be purely hereditary or biological, or requires dietary, hygienic, or mental guidance. For some years I have supervised the medical examinations of a private school of some 300 boys. For one of the students to reach high school age without a tonsillectomy is a very rare exception, and some have had three or four tonsillectomies! Certainly only a very small percentage could have been actually indicated.

The science of mathematics and its association with astronomy must have been a valuable influence in bringing the conceptions of early Greek medicine out of the realm of mysticism and superstition. The Greek physician and scientist was a mathematician as well as a philosopher. Sir James Jeans has said that only a mathematician can answer questions as to the nature of the physical world, and that when he answers, only another mathematician can understand. One of the great opportunities open to modern medicine that has not, I believe, been fully utilized or appreciated, is the application of mathematical and

statistical analysis to clinical experience. Most individual medical or even hospital experience is so restricted in volume and limited to such a short period of time that it is impossible that erroneous conclusions should not be drawn. A physician or clinic tries some new procedure, obtains in a small, perhaps selected, group favorable results. It is almost inevitable, unless these results can be controlled by a series of cases running into the thousands and observed over a period of ten or more years, that the conclusion will be greatly exaggerated or entirely erroneous. The danger is especially great that the entire profession will be misled if the observer is a prominent member of the profession or a plausible essayist.

Trudeau and some of his early patients improved under violent outdoor exercise, and it was years before he and the profession appreciated the need for rest and the injury resulting from exercise in tuberculosis. It is the same type of error that has led Cabot to give the impression that systolic mitral murmurs are rather a favorable factor in longevity than otherwise, in spite of insurance statistics proving conclusively that the mortality in carefully selected cases is 175+ per cent of the expected.

Tonsillitis and rheumatic fever are often associated conditions. It was a not unnatural inference that the relation was one of cause and effect, and that removal of the tonsils would prevent a recurrence of the rheumatism. It has taken twenty-five years and a large accumulated experience, after hundreds of thousands of unnecessary tonsillectomies, for the fact to be established that recurrences are as common after tonsillectomies as when the tonsils are allowed to remain. Probably no one physical sign has received as much study and interest as hypertension, and yet, after thirty years, few practitioners are familiar with the insurance experience in hypertension or realize the seriousness of the smaller degrees of increase in systolic and diastolic pressure. Although the erroneous standard of 100 plus the age as representing normal systolic blood pressure has been largely abandoned, yet most physicians, including many leading internists, do not recognize the significance of a systolic pressure of 136 to 146, or a diastolic of 90 to 98. The following charts are based on the records of hundreds of thousands of cases observed over periods of twenty years and more. They can be re-

lied on to give the true picture. It must be kept in mind that Chart I records the average and not the normal. The normal is much lower, especially at the older ages, as in the "average" group

Age	Systolic mm. Hg.	Diastolic mm. Hg.	Pulse Pressure mm. Hg.
20	120	76	44
30	122	78	45
40	124	80	46
50	128	82	48
60	133	86	50

Chart I.

are included many cases of beginning cardiovascular disease. It was a mathematician, Mr. Arthur Hunter, who first called attention to the error of confusing "average" and "normal," both for overweight and hypertension.

Departure From Average Systolic Blood Pressure	Actual Deaths	Expected Deaths by Company's Standard	Ratio of Actual to Expected Deaths
-15 to -5 mm.	349	401	87%
-4 to +4 mm.	396	394	101
+5 to +15 mm.	431	422	114
+16 to +24 mm.	59	46	128
Total	1,285	1,263	102%

Chart II.

The trends of mortality over long periods of time are of interest and of value in giving us a perspective for the varying incidence of disease and the results of treatment or efforts at prevention and control. Although tremendous gains have been made during the past few decades in the conquest of certain diseases, it is well to keep in mind how much still remains to be accomplished and how unavailing all effort has been with several major causes of death. While it is true that in this country during the past half century eighteen years have been added to the normal life expectancy, we should also keep in mind that most of this gain has been within the first two years of life, and that no gain is shown after the age of forty-five, and a very marked loss is shown in several important diseases, such as heart disease (now the largest single mortality

factor), in cancer, and in diabetes. In other words, while a baby born to-day has an increase in life expectancy of eighteen years, an adult, forty-five years of age or over, has no increased expectancy in comparison with fifty years ago, and probably even in comparison with 2,500 years ago, in the days of Pericles.

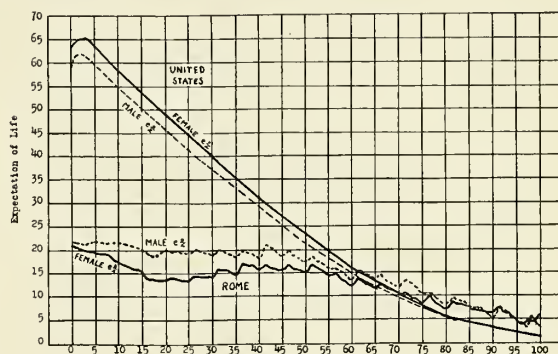


Chart III.

From Raymond Pearl's "The Biology of Death."

The improvement in disease control has come almost entirely in the field of communicable diseases, and no gain, but a steady loss, for those diseases which for want of a specific etiological factor may at least tentatively be considered as due to faulty methods of living. This condition deserves the most serious consideration from both the laity and the medical profession, and is interesting in its historical relationships. Greek science and philosophy laid the foundations for both the modern understanding of disease and for a sane and wholesome mental and physical life most conducive to longevity. With the decline in Greek culture and the passing of the Age of Reason, civilization crumbled, and the advances so nobly made in science and philosophy were lost in the darkness and superstition of the following centuries. Dogma and superstition replaced scientific research and reason. Sickness, poverty, and human misery were no longer subjects for experimental study or philosophical speculation. They became the punishment or the discipline of an omnipotent deity or the inflictions of evil spirits, and therefore beyond human interference. Aristotle's definition of the true function of the moralist "to promote good conduct by discovering and explaining the mark at which things aim," became a sacrilege, punishable by torture and death. It was not until the seventeenth century after Christ that, through the sciences of astronomy, physics, and chemistry, phi-

losophy under a revival of Greek influence, as Dewey points out, liberated physical knowledge from bondage and projected the roads upon which we could move forward.

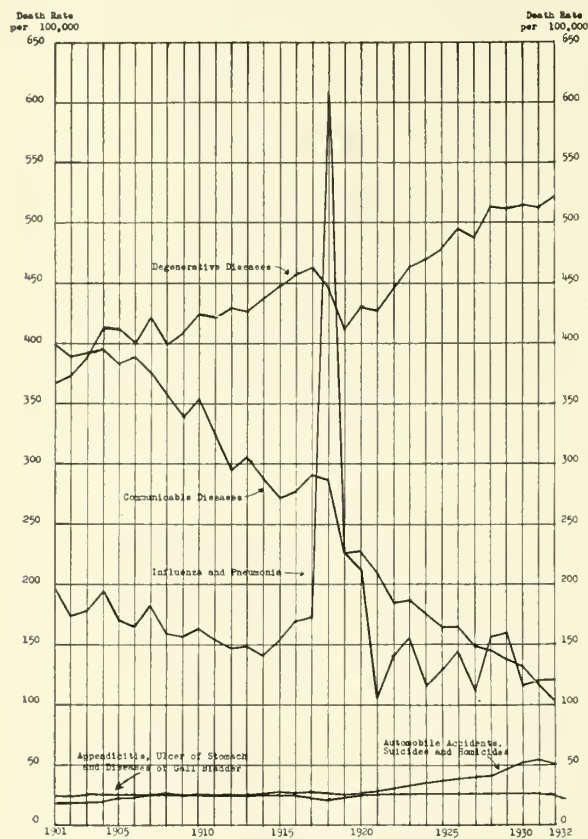


Chart IV.

It has been only within the past half century that there has come a similar demand and a similar opportunity for the emancipation of knowledge of social, legal, economic, political, medical, and religious affairs. It was not until 1842, in England, that the modern public health movement opened, with the report of Chadwick on the sanitary condition of the laboring population of Great Britain. Since that date, and principally within the past quarter of a century, all the communicable diseases have been brought within the scope of effective control, excepting only influenza and pneumonia. The first great movement for health education and volunteer warfare against disease was launched in 1904 by the organization of the Anti-Tuberculosis Association. The extension of normal expectancy eighteen years in the past half century, is alone a sufficient apology for science and for humanist philosophy, shifting, as Walter Lippmann expresses it, "the

center of philosophical interest and debate from the old problem of reconciling an all-good and all-powerful God with the existence of human suffering, to the present problem of how to equip man to conquer suffering and evil."

At birth the present expectancy in the United States is sixty years, and only ten years ago this was fifty-five years, a gain of five years in a decade. This has been accomplished by a continued improvement in the mortality at the younger ages, when a death prevented means the addition of many years to the after lifetime. On the other hand, the situation at the older ages, as we have seen, is becoming steadily worse. This explains why the total death rate has remained practically stationary during the past decade, while the expectation of life has increased five years. Typhoid fever, yellow fever, typhus, smallpox, and malaria have been almost altogether eliminated, and the contagious diseases of children are yielding rapidly to preventive inoculation and sanitation. Tuberculosis continues to show a remarkable decline. Ten years ago we thought marvels had been accomplished against tuberculosis, but it is now only 60 per cent as serious a cause of death as it was ten years ago. Each year it now declines from 7 to 10 per cent. Some authorities believe that in ten years more tuberculosis will be a minor cause of death, less perhaps than diabetes or automobile accidents. In twenty-five years this disease has been brought from above 150 per 100,000 to less than sixty to-day.

Unfortunately, this improvement in mortality which medical science has brought about from the infectious diseases at the younger ages has been more than offset by increasing death rates at the older ages, and here medicine appears to have made no progress in the effective control of these unfavorable tendencies. This fact certainly constitutes to-day the major challenge to science and medicine. This group of diseases, which, as suggested, may perhaps be attributed to heredity and to our modern methods of life, continues a steadily upward trend, unmodified by all our scientific knowledge and civilization: cardiovascular-renal disease, cancer, diabetes, mental diseases, appendicitis, peptic ulcer, and gallbladder disease, and in addition, deaths from suicide, homicide, and automobile accidents.

Chart IV illustrates very clearly these three trends.

Thirty years ago the death rate from heart disease was 140 per 100,000 of the general population. Twenty years ago it was 157 per 100,000. To-day it is 224 per 100,000.

Thirty years ago the death rate from cancer was 70 per 100,000. Twenty years ago it was 80 per 100,000. Today it is 102 per 100,000.

Thirty years ago the death rate from diabetes was 12 per 100,000. Twenty years ago it was 15 per 100,000. Today it is 22 per 100,000.

I would direct your special attention to that upper sinister line on Chart IV, rising with a discouraging persistency during the current century, indicating the increase in the chronic diseases at middle age and beyond. Each death among our national leaders prior to age seventy-five—our professional men, industrial leaders, and statesmen—from heart disease, high blood pressure, apoplexy, Bright's disease, diabetes, cancer, is registered on that line, and brings its regrettable economic and cultural loss to our civilization. This loss is magnified when as we know that although the newspapers state that "So-and-so" died "suddenly" of apoplexy or heart disease, actually these deaths are not in a pathological sense sudden, but have been preceded by years, sometimes decades, of progressive impairment of physical and mental structure and function, explaining many disastrous mistakes of conduct which seem inexplicable. There are probably in each year ten people partly disabled from the group of diseases represented by the upper line of Chart IV to every one who dies. The total deaths annually are about 600,000, and the total morbidity perhaps 6,000,000.

A modern railroad will not entrust its train to an engineer with thickened arteries, high blood pressure, or heart or kidney disease, because experience has shown that these men cannot be depended upon for prompt and accurate decisions in emergencies. Many beneficent political, social, and industrial enterprises have been wrecked from the same causes. The time must come when it will be considered as important for the president of a railroad to have normal blood supply to heart and brain as in the case of the engineer of the crack passenger express.

If this tendency to an increase in this group of diseases advances during the next half century as it has in the past, our political, industrial, and professional leaders will have an even shorter life expectancy after forty than they have today.

This tendency must be of recent development, as if it had continued from Biblical times to the present our allotted three score and ten would be very materially reduced. However, during the

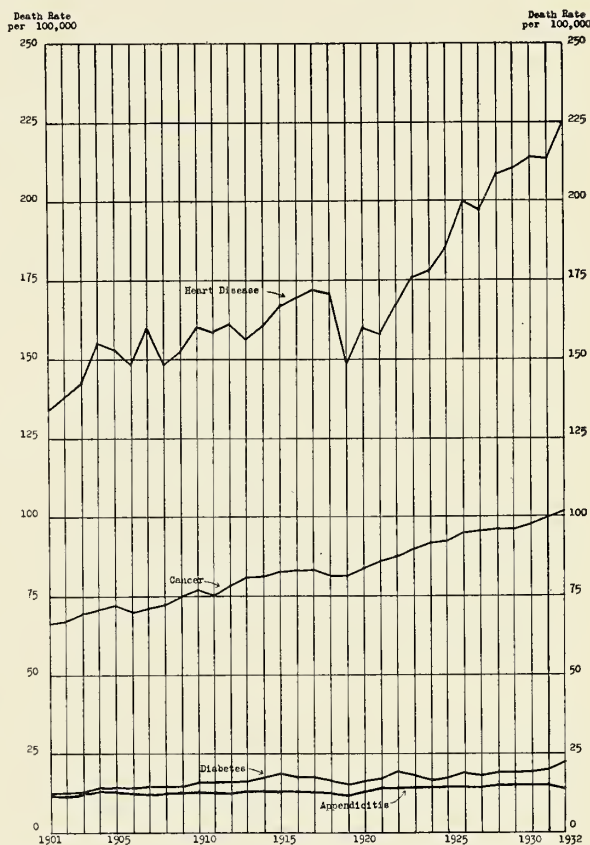


Chart V.

ten years ending with 1932, there is evidence of a decrease in life expectancy for all ages from one year upwards.

It is not a coincidence that the average longevity of the presidents of the United States before the Civil War was 12.13 years longer than of those presidents who followed the Civil War. Nor can Chart V of the death rate from heart disease, cancer, diabetes, and appendicitis—to take four typical examples of diseases which are steadily increasing in spite of all modern science can do—be explained on any other assumption than that there has come about in recent decades a profound change in our methods of life which is exacting a terrible toll in the most valuable and productive period of life. That a man of brains, culture, and vision should falter or weaken mentally or physically at fifty, sixty, or sixty-five, when the world could best benefit from his essen-

tial years of education, training, and experience, is the most tragic event of modern life.

To lower those ominous ever-rising death lines on Charts IV and V is today the major problem of medicine, not only from a health and mortality viewpoint, but also as an important factor in the civilization of the next century. However, it is not apparently a problem of medicine in the narrow sense of drug therapy or surgery. These fields need no apology in the light of their astounding discoveries and benefactions to humanity in the past half century, but they have proved powerless to stem the relentless tide of chronic degenerative diseases, though they have been tried, and often pushed even far beyond the possibility of effectiveness.

So strong is the malign influence of our present methods of life upon health and longevity that, even in several diseases where medicine and surgery have scored their greatest triumph, the mortality is still advancing year by year. As examples we may consider one in the field of medicine, one in surgery, and one in which both medicine and surgery have failed to bring about any favorable results:

The discovery of insulin in 1922 and the development of the dietetic treatment of diabetes are among the most brilliant advances of modern medicine, yet the increase in deaths from diabetes continues to rise steadily year by year, apparently uninfluenced by these discoveries. (See Chart V.)

The surgical treatment of appendicitis is probably the most dramatic advance of modern surgery, yet the increase in mortality from appendicitis year by year equals the persistency of diabetes mortality. (See Chart V.)

The treatment of cancer by surgery, x-ray, and radium, is an equally brilliant achievement, yet deaths from cancer are increasing even more rapidly than those of either diabetes or appendicitis.

When medicine and surgery fail in these three diseases, is it any wonder that they have failed in heart, arterial, kidney, and brain disease—each far more obscure, complicated, and far less amenable to treatment?

Is it perhaps reasonable to suggest that medicine may profitably return more and more to its ancient association with philosophy if it is to guide the coming generations as helpfully in the conquest of these degenerative changes and other diseases due perhaps to faulty living, as it has the present generation in the control of the communicable diseases? And be it said that some of

the true prophets of the profession—Holmes, Weir Mitchell, Osler, Winslow, Wilbur, Mayo, Barker, Cabot, Buzzard, and others, have spoken more and more in the language of Greek medicine and philosophy brought into accord with modern science. The problem which medicine must face for the present campaign is one of guidance in eugenics; in physical hygiene and in psychiatric training for the child; and for the adult, a sane, balanced, and satisfying physical, mental, and moral life, adequately adjusted to his individual environment. Barker expresses this viewpoint: "Medical aid should be sought not only for the cure and for the prevention of disease in single persons but also for guidance toward the desirable goals of life, in other words, for direction as to physical, mental, and moral hygiene. Today, in addition to the functions he formerly exercised, the medical practitioner is often compelled to take over some of the duties that had before been confined to the teacher, the clergyman, the philosopher, and the personal friend."

The need is more than one of longevity alone, for old age is not particularly to be desired unless accompanied by physical and mental vigor which permits happiness to the individual and service to mankind. Mere physical survival "sans teeth, sans eyes, sans taste, sans everything" is not alluring. Epictetus said, "To a longer and a worse life, a shorter and a better is by all means to be preferred by every one." Winslow says today, "If prolonged life and increased vitality are bought at the cost of shorter vision and decreased joy in living, they would be too costly." The Latin adage based on Greek culture, "*Mens sana in corpore sano*" must be the slogan for medicine, for philosophy, for industry, and for society, in the coming generation. I am afraid it is not appropriate for this generation.

It may be worth while to review very briefly some of the factors in the life of the modern man of our much vaunted civilization from the point of view raised by a consideration of present unfavorable mortality trends.

1. Choice of ancestors. Heredity is undoubtedly the chief factor in longevity, virility, and mental ability. Raymond Pearl has said, "Inherited constitution fundamentally and primarily determines how long an individual will live." Little instruction is given to the young on the subject of

eugenics, and little attention is paid to what is given. Plato understood the beneficial effects of careful breeding for superior ability better than we give any evidence of understanding today.

and harden the body to changes in temperature than to avoid all drafts or exposure. The object of modern ventilation is to maintain an even, usually over-heated atmosphere—exactly the con-

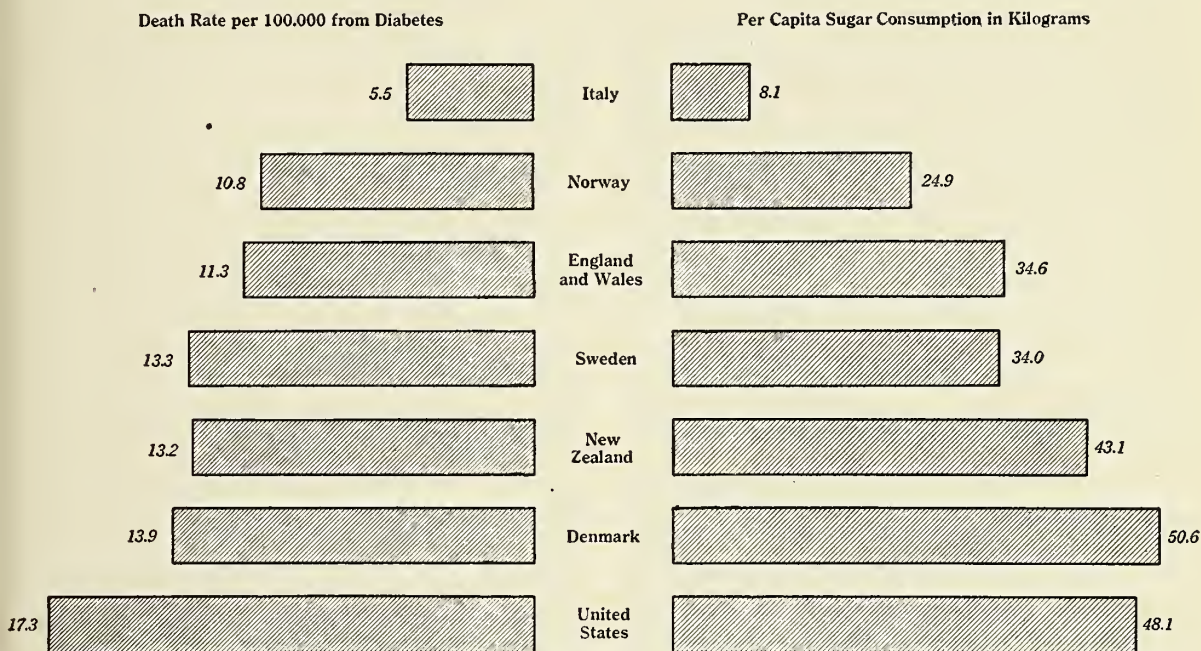


Chart VI.

Tacitus said, "Think of your ancestors and your posterity." Oliver Wendell Holmes' aphorism for health and longevity was to "choose one's ancestors wisely." High blood pressure, diseased arteries, heart disease, mental disease, have strong hereditary tendencies.

With the breaking of social barriers, and unrestricted and unadvised choice of mating, the hereditary effect of attention to family tradition in creating some of our best American stocks is being dissipated, and yet young people might be guided in their mating preference by wise medical education and counsel.

2. Modern environment—of urban industrialized Twentieth Century civilization—speed, noise, constant nervous and physical strain. Accidental automobile and aeroplane deaths are not the only deleterious effects of the speed age. It accelerates as well the normal aging process. Railroad engineers have always been especially liable to heart and arterial diseases. Today every man in a sense is his own engineer.

3. Modern dry, over-heated houses, offices, and factories may be more comfortable; they are not more healthful. It is more healthful to accustom

dition to weaken resistance. We might profitably remember a saying of Epictetus: "They who have a good constitution of body can bear heat and cold, and so they who have a right constitution of soul can meet anger, grief, immoderate joy, and the other passions."

4. The average modern man is more or less under the influence of at least two drugs daily—caffeine and nicotine—often three. The story is always well received of the man who lost his desire for longevity when his physician told him it was conditioned on giving up tobacco, coffee, and alcohol. But we are discussing longevity irrespective of this understandable preference. The enormous quantities of the cardiac poison nicotine which are being consumed today by all ages and both sexes, must at least be considered as a factor in cardiac disease, and perhaps in peptic ulcer.

5. Diet. We over-eat, especially of meat, sugar, and starches, and the effect is exaggerated by insufficient outdoor exercise. Chart VI shows the incidence of diabetes in various countries with the striking parallel in the consumption of sugar. Over-eating is perhaps no more injurious than

our hurried meals—time begrudgingly taken to supply fuel as one fills a car with gasoline. Quiet, interesting, cultured conversation has disappeared from our family or social meal-times. Dr. Holmes' Autocrat of the Breakfast Table would gain scant courtesy today. And yet we know that normal digestion requires more than a sufficient quantity of food. There is a definite and necessary psychic element. Epictetus well said, "At every feast remember there are two guests to be entertained—the body and the soul. What you give the body you presently lose, but what you give the soul remains forever." Constipation is probably merely one and a relatively innocuous result of wrong diet, lack of exercise, and an unhygienic life which may have much more serious results in appendicitis, gallbladder disease, gastric ulcer, diabetes, kidney, heart, and arterial disease.

6. Exercise. Regular physical exercise, baths and rubs, from childhood to old age, were a daily part of a Greek gentleman's sacred observances. It is no wonder they attained to unexcelled national beauty and health. In Greece, time even was measured in units of sport—the four-year intervals between Olympian games. Subways, motor cars, buses, railways, elevators have eliminated for us exercise during the week. To put seven days' normal exercise into a Saturday afternoon or Sunday morning is probably more injurious—especially after age fifty—than no exercise at all. Stewart Chase wisely says: "Modern play takes on too much of compulsion to win, rather than the privilege to enjoy. The nervous strain and exalted egotism of modern college major team athletics are of very questionable benefit to participants and spectators." The growing custom of gambling in sport and social affairs carries the strain of business competition into the all too short periods allotted to recreation. It is, besides, a confession of inability to enjoy and appreciate the quiet and restful charm of nature or of congenial human intercourse. It is a part of our national prodigality in burning the candle at both ends.

7. Unsatisfactory relationship between public and medical profession. There is an increasing feeling among laymen that it is extremely difficult to obtain for oneself or family competent medical service at reasonable cost. State and government control of medical practice is very loose. The average layman is in no position to judge be-

tween the abilities of the various cults and schools, all of which are in many states equally recognized under the law, nor between individual practitioners. When a physician is ill, or his wife is ill, he knows the education, the experience, the honesty, the judgment, the skill, and the professional reputation of the surgeon or the physician he consults. The layman has no means of knowing.

The best members of the profession are the most conservative in operative interference, or in treatment. The ignorant, poorly trained, or dishonest practitioner is too ready to advise operation or some drug or other therapy which may be but a cloak for ignorance or cupidity. On the other side of the picture, medical practice is the most ancient and most honorable of the professions, and is today carried on in most part with devotion and sacrifice. The average practitioner is greatly underpaid, considering the expense of his education, the skill required, and the hardships of his life. His mounting expenses tend to preclude the time and care which he should give his cases but which his moderate fees do not permit.

Furthermore, owing to lack of adequate education, both lay and medical, the average man consults a physician only when he is ill, and the average physician is almost wholly occupied in the treatment of disease. The proper time to consult a medical adviser is before the onset of disease, and periodically from birth to old age, in order that the need for treatment may be avoided. Under a proper relationship between profession and laity, much the larger responsibility of the physician should be to know and instill correct habits of life so that disease may be prevented. The significance of the illuminating experiment of the Metropolitan Life, which indicated that, during a period of five years, the expense of periodic physical examinations and advice given to a certain group of policyholders paid, in dollars, three for one in increased life expectancy, is totally unappreciated by either laity or profession. This question is a most difficult one, but vital to our national welfare.

8. Our confused, superficial, and commercialized system of formal education is undoubtedly responsible for many of the mental derangements which have filled our asylums to overflowing, and is also responsible for even more of the social and intellectual maladjustments of modern society

which have serious and far-reaching effects, but which may not reach the degree of institutional treatment. The criminal, the anarchist, the divorcee—common types of maladjustments in our social, national, and family life—may often be the result of poor training and education, combined, perhaps, with other physical and emotional defects. Students are crammed with a heterogeneous mass of ill-assorted information, but given little true appreciation or wisdom. The aim is material success, not to deepen the understanding.

Subsequent adult education—largely sensational novels and magazines, drama, trade journals, movies, daily papers and Sunday supplements—does not rise above the mental requirements of a fourteen-year-old child, and cannot develop maturity of thought or depth of character. Classical literature is out of style. We need to make practical application in many of our ills today of the prescription which was suggested by the inscription over the entrance to the library at Thebes, "Medicine for the soul."

Dr. Joseph Collins, in a paper before the New York Academy of Medicine, gave advice on the education of physicians which is equally applicable to industry and the other professions: "Physicians should steep themselves in the humanities. * * * The sort of culture they need is best obtained by familiarity with poets, philosophers, biographers, musicians, and art. I am convinced that the medical student who knows the great classics of the past is better equipped to practice medicine than he who has medical text-books at his finger-tips. * * * The welfare of the soul is enhanced by culture."

9. Spiritual uncertainty and unrest. Lippmann in his "Preface to Morals" has well expressed the present confusion of ideals which tends to

destroy that confident and serene background to life which is so essential to physical and mental health: "The modern man desires health, he desires money, he desires power, beauty, love, truth, but which he shall desire the most, since he cannot pursue them all to their logical conclusions, he has no longer any means of deciding. His impulses are no longer parts of one attitude toward life; his ideals are no longer in a hierarchy under one lordly ideal. They have become differentiated. They are free and they are incommensurable. * * * The religious synthesis has dissolved." While modern interest in health and hygiene may be interpreted as one significant illustration of a changing philosophy of life in which more primitive and supernatural religious beliefs are being supplanted by a humanistic philosophy, nevertheless, the transitional period is leaving many without the spiritual certitude which formerly anchored their emotional life and guided their daily actions.

However, we may not be too impatient of the final flowering of any spiritual growth. The teachings of Plato, of Buddha, of Christ, were the fruit of centuries of Attic, Indian, and Hebrew spiritual experience. Philosophy now has science as a guide, and we may well hope for the evolution of a new religious synthesis in which the harmonious blending of the spiritual and the intellectual may bring a peace and an understanding heretofore impossible, and only held out as a provisional reward in a future life.

If philosophy and medicine sense this need for bringing order out of our present confused civilization, and will contribute in a united effort scientific facts, sound reasoning, and practical guidance towards a saner life, may we not hope that the result will be expressed in the gradual and permanent enhancement of human health, longevity, and happiness?

K-M INFRA RED RAY LAMP, TABLE MODEL NO. 630, NOT ACCEPTABLE

The Council on Physical Therapy reports that the Infra Red Ray Lamp, Table Model No. 630, manufactured by the Knapp-Monarch Company, Belleville, Ill., resembles a reading lamp in outward appearance, the difference being that an electrical heating element takes the place of an electric bulb. The element draws about 300 watts on a 110 volt circuit on either alternating or direct current. The Council finds little difference, if any, in therapeutic effect between this infra-red ray lamp and an ordinary bathroom heater. The advertising lists thirty-one so-called "Common Ills" for which there are given suggested methods of treatment.

Among other misleading indications for the therapeutic use of infra-red rays, the firm lists the following diseases: angina pectoris, asthma, biliousness, heart disease, itch and delayed menstruation. The Council is not in possession of critical evidence to support these unwarranted suggested indications for the therapeutic employment of infra-red radiations. Promotional advertising matter of this kind in effect constitutes an appeal to the public with arguments that are unscientific and may harmfully promote a feeling of false security on the part of the public. The Council on Physical Therapy declared the K-M Infra Red Ray Lamp, Table Model No. 630, unacceptable for inclusion in the Council's list of accepted devices. (*Jour. A. M. A.*, February 3, 1934, p. 372.)

THE RISE OF CLINICAL THERMOMETRY IN THE UNITED STATES*

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HAVING chosen the title of my address all that seemed necessary in its preparation was to consult the indices of some American medical journals extending over a long period of time. For this purpose the *Philadelphia Journal of Medical and Physical Sciences* and its successor *The American Journal of the Medical Sciences* were chosen, first, because their publication has been continuous since 1820, and, second, because of the high standard of the articles appearing in them throughout the entire period. Strange as it may seem, the word thermometer did not appear in the indices of these journals till the year 1866.¹ This almost caused me to abandon the thought of trying to trace the use of the clinical thermometer in the United States, to change the title and simply review Wunderlich "On the Temperature in Disease. A Manual of Medical Thermometry," which was printed in Leipzig in 1868 and translated and published in New York in 1871. In the preface of his book Wunderlich states: "For the last sixteen years my attention has been uninterruptedly directed to the course pursued by the temperature in disease of various kinds." He then must have begun his observations about 1851.

As no discovery apparently takes place without some preliminary observation, it seemed worth while to look up some use of the thermometer in medicine previous to the time of Wunderlich.

First, then, as to the thermometer itself. Galileo invented the thermometer, a thermobaroscope, about 1595. Sanctorius, professor of Medicine at Padua, in 1611 suggested its use to measure the degree of fever in disease. The gradual improvement of the instrument, the difficulty in making two instruments alike and the long struggle to find suitable fixed points of reference for the scale need not be entered into. Suffice it to say that although the evolution of this process is most interesting it was not till 1694 that Renaldine proposed the freezing and boiling points of water as points of reference for

grading the degree of heat. In 1714 Fahrenheit used mercury in a closed tube and devised his scale. Celcius in 1772 divided the interval between freezing and boiling points into one hundred parts and shortly thereafter Märten Strömer inverted Celcius scale to form the modern centigrade scale. It was not till 1822 that thermometers which varied less than a degree at zero were made and even today no two mercury and glass thermometers agree. Furthermore, it was not until Aitken^{4, 6, 7, 8} introduced the self-registering instrument that medical thermometry became possible.

So much for the instrument itself. Poor tools, however, have never prevented man from investigating to accomplish his end, if the necessity or impetus were present. Sanctorius' suggestion lay dormant till 1750 when Martine of Scotland again took it up, followed by de Haen of Leipzig and Vienna and James Currie of Liverpool in 1798.¹⁰ Their observations passed unnoticed.

One must then investigate the reason for lack of interest in the use of the thermometer in medicine. A page to page perusal of the journals mentioned, it was thought, might furnish a clue for the lack of interest among physicians and such an examination was then undertaken. In the entire period from 1820 to 1868 the word thermometer is used in but sixteen original articles by American authors.²

We must digress at this point in our subject. During our colonial period, American physicians took their instructions from Sydenham and Boerhaave, later from Cullen and Brown, and these systems of medicine were followed by that of Rush, at least in Philadelphia. Some time after the beginning of the nineteenth century French medicine came into vogue and it was not till the time of Johannes Mueller (1840) that German medicine began to influence the United States.

Fever is defined by Webster as "elevation of the bodily temperature," but up to 1850 the definition of fever was not so simple. Without quoting directly from the works of the writers mentioned above or the medical dictionaries of

*Address of the retiring president read at the annual meeting of the Minnesota Academy of Medicine, January 10, 1934.

the period preceding this date we find two explanations of fever: first, that it was a spasm or excitation of the arterial system; second, that it was an excitation of the nervous system or brain. That is, fever was an entity and the various forms and varieties of fever were a modification of the fever, "a thing in itself." To make this more clear, fever was regarded as a primary disease and not a secondary effect. "Caloric," an imponderable entity, had an individual status and was not recognized as a form of energy until 1842-1845 and physicians were slow to adopt the new view.

The medical investigator at that time then attempted to find out, if possible, what were the factors which influenced the disease to become typhus fever, yellow fever, intermittent or spotted fever. Their attempts took the form of long essays with titles such as: "The climate, topography, and diseases of such and such a place," "Epidemic and endemic diseases of the summer epidemic at Smithville," etc. In these essays the country, soil, vegetation, prevailing winds, rainfall, daily and seasonal variations in temperature and dew points are elaborately described and tabulated. The factors influencing the form the fever might take were sought in external conditions. No temperature of the patient was recorded in any of these essays, but the patient's condition described as a fever of a hectic, remittent, intermittent, or continued type and various adjectives used to describe the degree of fever as high, slow, moderate, etc. That is to say that fever was known to be present and that was sufficient. This type of medical essays culminated in this country in Drake's remarkable work, "The principal diseases of the interior valley of North America," published in 1850. It was hailed with acclamation as the solver of all our problems. Alas! within a decade or two its usefulness in this regard was gone, though it is still our classic and foremost topographical and sociological survey of the Middle West.

I spoke above of the theories of fever that prevailed at the period mentioned. It is interesting to speculate as to the origin of these ideas. It must have been early noted that occasionally the temperature of a paralyzed limb was cooler than the normal one and also that the occlusion of the blood supply of a limb caused coldness of that limb.

Possibly these observations formed the basis

of the arterial and nervous theory of fever. Many of the temperature observations of this period were taken before and after ligature of a blood vessel for aneurism or comparative temperatures of normal and paralyzed extremities were noted. So comparative temperatures in such cases were recognized as having some prognostic value.

After the above ideas of fever became unsatisfactory there was for a time no accepted theory of fever. As late as 1832 a French writer⁵ states, "The word fever is for physicians a sign which corresponds to those by which mathematicians indicate unknown quantities." Robley Dunglison, in his *Medical Dictionary* (third edition) of 1842, equivocates when he defines fever as "one of the most frequent and dangerous afflictions to which the body is liable * * *. It is not characterized, however, by any one, but depends on the coëxistence of many symptoms."

We shall leave here the further discussion of fever, as shortly after this time the secondary rôle of fever began to be suspected and temperatures now and then came to be recorded. One must say that the normal temperature of the body was still rather vaguely known. One writer (I am referring to American writers only from now on) states that it was 96°, another 90° to 100°, and others 97° to 99°, and still others 98° Fahrenheit.

Thermometers, I may state, in the early days of the nineteenth century and before must have been rather expensive instruments, and the possessor of one often mentioned it specifically in his will. This is perhaps another reason why the temperatures of patients were not taken, the physician not possessing a thermometer. The instrument of that time also was awkward for the purpose.

The first instance of the use of the clinical thermometer in the United States that I have been able to find is by Elisha North, and he mentions it but once:

"At nine o'clock Monday morning (May 14, 1810) her heat measured by the thermometer in the axilla was one degree above the natural temperature."⁶

Note that he does not mention the degree of normal temperature.

The next instance is by Job Wilson, and singularly enough the observations were on patients having the same disease, epidemic cerebro-spinal

meningitis. Wilson took the temperature on four of his patients. I quote one paragraph:

"Monday, June 27, 1814.—Gave oxygen gas to Miss: measured her temperature before inspiring it and found it to be 96° in the mouth and under the tongue, and 78° in her left hand, Fahrenheit Scale. The time of holding the thermometer in her mouth or hand was 15 minutes: in half an hour after first inspiration of this air the mercury in the thermometer rose in her hand in ten minutes to 86° and under the tongue in five minutes to 97½°. On the 28th, measured temperature of her left hand and found it to be 82¾°: after breathing two bottles of oxygen gas (which was in about an hour, by breathing this air for three minutes at a time once in about twenty minutes) in one hour and a half from the commencement of her breathing it, I measured the temperature of her left hand and found it to have risen to 89°. Each time after breathing this gas, her eyes appeared much brighter, her countenance and lips became a livelier red and assumed a healthier aspect: but she complained of being too hot, threw off the bed clothes, and said she wished to be thrown into a brook. After this her recovery was rapid."

The narrative of this case is interesting because the temperature was taken more than once and was used to gauge the result of treatment and the prognosis. This view does not appear in the American periodical literature with regard to fever till over a generation later. Wilson also states that the idea of administering oxygen was his own. It is apparent here also that Wilson was familiar with the works of James Currie, as he so states. Currie, in 1798, published his work on the control of fever by cold bathing, gauging the frequency and temperature of the bath by the temperature of the patient. Unfortunately Currie's ideas were disregarded by the English physicians and made sport of in Germany, as were the thermometric observations of de Haen. It may be of interest to note here that Napoleon's temperature was taken once during his last illness in 1821.³

The first instance of the use of the thermometer, found in the journals mentioned, is in 1821, in an article by Richard Harlan of Philadelphia, "On the Generation of Animal Heat." He mentioned an instance where the spinal cord was injured by a fracture of the dorsal vertebræ, and noted that "the portions above the injury were of a natural temperature, while the parts below the fracture indicated by the thermometer a morbidly increased temperature." This was twenty-six years before Sir Benjamin Brody made

known his experiments on "the Elevation of the Temperature after Division of the Spinal Cord" (Med.-Chir. Transactions of Med. Chir. Soc., Edinburgh, XX, 118). Harlan states he can only speculate as to the cause of this and adds that explanation "belongs to the destiny of future ages."

The next we find of the use of the thermometer occurs ten years later in an article: "External Iliac Artery Successfully Tied" (October 5, 1831). "This day the temperature of the affected limb is 84 between the toes and 86 at the inner part of the thigh. That of the sound limb is 94 and 96 at the corresponding points." This was before the operation. October 7, three hours after the operation, temperature of left limb was reported as 85, of the other 91, October 8, the temperature of both limbs was 87. No further temperatures were taken. The patient recovered.

In 1833 Samuel Jackson gives thirty-three case histories of cholera patients. In six only of these was the temperature taken and in only one of the six was the temperature taken more than once during the course of the disease. Apparently these were incidental observations of no clinical import.

In 1834 appears a case history of a paraplegic. Galvanism was applied to the paralyzed limb. "The temperature which previously had been as low as 62° of Fahrenheit thermometer in a very brief space of time arose to 97°." Apparently the author thought the heat was distributed by the nerves.

Not till six years after this observation, namely in 1840, do we find a temperature recorded. A criminal was to be executed and the physicians attempted to take his temperature before and after death.

"The temperature of the body taken in the mouth was 82° Fahrenheit, temperature of the room 70½°. Nine minutes after the execution the temperature of the body near the axilla was 85° Fahrenheit."

In a footnote the experimenters state, referring to the ante-mortem temperature:

"The experiment is imperfect in consequence of the bulb of the thermometer having been removed from the mouth before the mercury ceased to rise—the tube was attached to a metal scale, which evidently producing a disagreeable taste was removed."

What the idea of taking the temperature after death was to elucidate, I do not know, but in

many of the protocols of autopsies one will find the hour after death, the room temperature, and the abdominal temperature of the corpse recorded.

In 1843 in a case of "Ligature of the External Iliac Artery for Aneurism" comparative temperatures of the limbs were taken for four days.

In 1847 James Trask writes, "On the Nature of Phlegmasia Dolens." Here the first temperature chart appears. Fifty-three cases are charted and temperatures given, but no thermometer was used, the temperatures being recorded as warm, warmer, natural, etc. The charting shows an advance in ideas at least.

An interval of twelve years now elapses (1855), when we find in "Yellow Fever—Considered in Its Historical, Pathological, Etiological, and Therapeutical Relations," by R. La Roche:

"The increased heat of the blood beyond the healthy standard in the early stage of some forms of Yellow Fever, is placed beyond a possibility of a doubt and cannot be a matter of astonishment. It is, of course, not peculiar to the disease and is generally, though not always, found in other fevers and in phlegmasia."

One notes here that the idea of fever is undergoing modification, and also that but little knowledge existed as to actual temperature in disease.

We wait now four years more, when we find an article written by William A. Hammond and S. Weir Mitchell on "Experiments with Curare." Here are carefully recorded temperatures of a rabbit and a pigeon at stated intervals until the time of death, after transplanting a portion of the poison in a wound (the hypodermic syringe had not as yet been invented). It is true that this does not record temperatures in a human being, but it probably marks the beginning of experimental medicine in the United States and the bringing into medicine here the necessity of scientific methods. It also shows that thermometers suitable for taking human temperatures were available. After this time we find in the reports of the meetings of the staff in the Pennsylvania Hospital many of the internes in reporting the cases give records of the temperature. At first the temperature was taken once or twice during the course of the disease, then daily, and later twice or three times a day. This procedure possibly seemed an unnecessary stunt on their part to the elder members of the profession and perhaps an over-refinement of observation. But evidently some one was advising

them and they were getting the idea of the significance of the body temperature in disease, though little importance was attached to the observations. Horatio C. Wood, in 1863, reports eight cases of sunstroke with temperatures given. He says:

"Three thermometers were compared and found to agree in these cases, so there can be no doubt as to the reliability of these observations."

Hitherto I have cited only observations made by American authors, but, in 1866, there is a review of an article from the London *Lancet* of November 4, 1865, by Sidney Singer. He says:

"During acute inflammations of any tissues of the body, the temperature is always abnormally elevated, often greatly so. Not infrequently it rises from 98 or 99 (the normal temperature in the axilla) to 103-105 Fahrenheit. The amount of elevation is proportional to the intensity of the inflammation, and thus the temperature measures the intensity and duration."

This marks a new pathology, or at least the first intimation of it in the *American Journal of Medical Sciences*. Undoubtedly Singer got thermometric ideas from Wunderlich. In 1867 a long review of an article by Austin Flint, Jr., appears. The original was published in the *New York Medical Journal* in November, 1866. Flint says:

"The thermometric phenomena of disease have been studied of late by clinical observers in Germany and Great Britain * * *. It is proper to state at the outset that my own experience in the use of this instrument has extended over only a few months, but this short period in which I have used the thermometer in clinical studies has afforded striking illustration of practical value."

He then concludes, summarizing his remarks with ten propositions relating to the diagnostic and prognostic use of the thermometer. This article apparently was the first contributed by an American author on the use of the clinical thermometer and if not the first certainly the first that was widely read and concretely brought the idea of clinical thermometry before the American medical profession.

I wish to thank Dr. J. M. Armstrong of Saint Paul for his aid in looking up references and his suggestions in writing this paper.

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GANGRENOUS GALLBLADDER*

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UNTIL recent years, gangrenous gallbladder was believed to be of rare occurrence. Vest, in an exhaustive study, was able to find only seventy-one reports in the literature to 1933, of which fifty-five were in sufficient detail to permit him to make an analysis. He did not include in this number the sixty cases reported from The Mayo Clinic by Baumgartner in 1929 after study of 4,575 diseased gallbladders. Vest reported nine additional cases of gangrene of the gallbladder. He gave the incidence as 0.7 per cent in a series of 1,000 operations on the gallbladder in the Johns Hopkins Hospital.

In reviewing 508 cases of acute cholecystitis found in the course of 9,446 operations on the gallbladder performed at The Mayo Clinic, it was discovered that there were sixty-one instances in which the gallbladder had perforated. A further study of the 508 cases reveals that there were sixty-eight in which there was gangrene of the gallbladder, or an incidence of 0.72 per cent. In sixty of these, the gangrenous process was extensive and involved almost all or all of the viscus; in eight it was only partial. In thirty-three additional cases, the gallbladder contained single or multiple small areas of necrosis but it is debatable as to whether these small necrotic areas represented gangrenous processes.

Any condition that causes obstruction to the circulation of the gallbladder may be responsible

for the production of gangrene. The extent of the involvement depends on the site of the interference with the blood supply and accounts for the presence of partial or complete gangrene. Vest summed up the possible causes of obstruction to the circulation as "edema, thrombosis, embolism, pressure by stones, tumors, enlarged glands, spasm, torsion, distention, gas bacillus infection, hyperplasia of the cystic duct mucosa due to chronic inflammation, and severe acute infection." He stated that with the exception of torsion, usually more than one of the conditions are present to account for the gangrene. Baumgartner felt that toxins might also play a part in the etiology.

Stones were present in sixty-seven of the sixty-eight gangrenous gallbladders. In the one case in which stones were not found, the possibility of a stone being buried deep in the cystic duct could not be ruled out, for extensive exploration was inadvisable on account of the severity of the inflammatory process. In only two cases were stones found in the common bile duct. The preponderance of calculi in our series of cases of gangrene of the gallbladder is significant. Whether the circulation was disturbed by direct pressure from the stones, by infection, by edema of the wall of the gallbladder, or by overdistention of the viscus, is debatable.

It seems rather unusual that the number of males exceeded the number of females; thirty-nine of the patients were males and twenty-nine

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females. Two of the patients were less than thirty years of age, and three were more than seventy years of age; all five were males. The average age of the sixty-eight patients was more than fifty years.

Two patients had undergone cholecystostomy respectively four and fourteen years before the present trouble. Twenty-nine gave histories indicative of previous acute attacks of biliary disease, whereas thirty-five gave histories suggestive of trouble with the gallbladder, but had had no acute attack until the one which caused them to come to the clinic. Four patients in the series had never had any symptoms referable to the biliary tract until the attack in which they came for consultation. On admission the average duration of the attack in the sixty-eight cases was seven days; this accounts for the fact that in many instances the attack was subsiding at the time of our first examination. The average period of observation before operation was six days, about two and a half days of this time being spent in the hospital. This means that an average of thirteen days elapsed from the onset of the acute attack until the gallbladder was explored. In comparatively few instances did the general condition of the patient seem to require his immediate admission to the hospital.

As would be expected with cholelithiasis, colicky pain in the right upper abdominal quadrant was the most persistent complaint; it was made in fifty-five cases. Thirteen patients stated that they had noticed jaundice with the attack. Ten had had high fever and severe chills. Our initial examination revealed jaundice of some degree in eleven cases. In only five of these was there any appreciable increase in serum bilirubin. Marked tenderness under the right costal margin was the most prevalent physical sign and was present in forty-nine cases. Rigidity of the right rectus muscle could be demonstrated in twenty of these. The presence of an extensive inflammatory process was indicated by a palpable mass in the right upper abdominal quadrant in twenty-six instances. Forty patients were found to have a temperature above normal, usually about 100° F.; the highest temperature was 106° F. Often the findings at operation were out of all proportion to the number of leukocytes, which was 10,000 per cubic millimeter or more in only thirty-one cases; in three of these the count was more than 25,000. In forty-two cases it was

inadvisable and unnecessary to obtain a roentgenogram of the gallbladder because of the evident acute stage of the disease. In the other twenty-six cases a roentgenogram was taken. In sixteen cases the gallbladder was reported to be nonfunctioning; in one case, to be nonfunctioning with stones; in three cases, to be poorly functioning; in four cases, to be poorly functioning with stones, and in two cases no abnormality was revealed.

Cholecystectomy was performed in forty-nine of the sixty-eight cases, with three deaths. Partial cholecystectomy was carried out in eleven other cases, and a dressed tube was sutured to the remaining portion of the gallbladder; there was one death in this group. In eight cases cholecystostomy was performed, with no deaths. In most instances there was evidence of some degree of localized peritonitis; in one case general peritonitis was suspected but the patient recovered. The common bile duct was opened and drained in only four instances; in two of these, stones were discovered. It is of interest that the patients whose common bile ducts were opened had uneventful convalescence. Perforation of the gallbladder had occurred in eleven cases, and two of the deaths were in this group. In five of the cases in which the gallbladder had perforated, an abscess had formed about the site.

Conclusions

It is evident that there is no accurate guide to the diagnosis of gangrene of the gallbladder. In going over the past histories it will be found that while some patients will have had previous acute attacks, others will have had only mild symptoms referable to the gallbladder. A few patients may be found who never have had any previous symptoms referable to the gallbladder. As a rule, if a gallbladder is gangrenous, one discovers a greater degree of tenderness and rigidity in the right upper abdominal quadrant than in uncomplicated cases of acute cholecystitis. A definite mass was palpable in about a third of our cases, which should lead one to suspect the presence of a severe inflammatory process. Fever and leukocytosis are somewhat indicative in about half of the cases, although these evidences are frequently misleading. In most instances, roentgenologic examination of the gallbladder is not necessary or advisable, for an acute cholecystic condition is evident.

If calculi are discovered in the common bile duct, or if there is strong evidence of the presence of stones, one should not hesitate to open the duct. The hazard of leaving stones in the common duct seems greater than that incurred by removing them and establishing drainage of the common duct in the presence of gangrene of the gallbladder. Cholecystectomy is indicated in most cases. Convalescence is as satisfactory as after cholecystostomy, and the possibility of further cholecystic disease obviated. If it is evident that the risk of the operation will be materially increased by the dissection necessary for total removal of the gallbladder, partial cholecystectomy may be carried out, leaving in situ that part of the wall of the gallbladder which is adherent to the liver. This remnant is folded about a dressed tube and sutured to it. The mortality rate in the 68 cases of gangrene of the gallbladder was 5.88 per cent. It is true that all four deaths occurred in cases in which partial or total

cholecystectomy was performed. Marked local peritonitis was present in two of these cases at the time of operation, and in both instances the patients also had definite acute appendicitis. Death in the third case was caused by bronchopneumonia, and in the fourth case, it resulted from a pulmonary embolus.

It seems advisable to operate early in most cases of acute cholecystitis and, in any in which perforation of the gallbladder or gangrene is suspected, prompt exploration is indicated.

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DIET IN THE TREATMENT OF GALLBLADDER DISEASE*

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That dietary management plays a very important role in the medical treatment of gallbladder disease is generally conceded. Mason and Blackford advised medical treatment in two-thirds of their cases. The remaining third were treated surgically at once.

In arranging a diet for patients with gallbladder disease a number of factors must be taken into consideration. First of all, impairment of liver function is almost always present. The injured liver may be unable to metabolize protein cleavage products and variable symptoms of toxemia are the result. In the second place, gastrointestinal disturbances, both secretory and motor, resulting in indigestion and flatulency, may be due to the lack of bile or congestion of the intestinal mucosa. This includes gastric hypo- or anacidity and complete achylia.

The amount of protein in the diet should be restricted according to the degree of liver func-

tion impairment present in the case under consideration. It has been found that low protein diets tax to a lesser degree the detoxifying power of the liver because there are fewer toxic split protein products which the liver must convert into non-toxic urea. It has also been shown that animals with damaged livers live longer on a low protein diet. High carbohydrate and low protein diets are consequently indicated in all cases of gallbladder disease. Protein, however, should not be reduced below one gram daily per kilogram of body weight.

Regeneration of damaged liver parenchyma is accelerated with a low protein intake. Meats produce more toxic by-products than other proteins and should therefore be restricted to two or three small servings per week or eliminated entirely. Meats should be free from fat and should be either roasted or grilled. Milk is perhaps the best source of protein. One liter provides about 40 grams. One or two eggs may be added to the menu occasionally. Broths and

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meat soups are of no value and should be avoided.

When the amount of bile emptied into the intestinal tract is decreased or absent, putrefaction is encouraged. This is another reason in favor of low protein intake.

The carbohydrate foods should be bland and simple. The bulk of these may be in the form of cereals, rice, toast, and mashed, boiled or baked potatoes. Preserves, honey and other sweets may be taken moderately. Orange or fresh tomato juice may be added as desired to supply vitamins. As a rule raw fruits and leafy vegetables are not tolerated so well. Puréed vegetables may be tried. If constipation results because of loss of bulk, agar may be added to the food.

Fats in the diet of patients with gallbladder disease should be restricted both as to quantity and quality. Fried and greasy foods are especially troublesome. Some fat, of course, is necessary in order to supply needed calories and important vitamins. They should be used sparingly, however. The most desirable fats are butter, cream, egg yolk and occasionally a little crisp bacon. Foods with a high cholesterol content such as liver, kidney, brains, fried fish, fried meats, stews, goose, duck, game, pork, sweetbreads and spiced foods should be avoided. Dried peas and baked beans contain phytocholesterol and should also be eliminated from the diet. The oral administration of bile salts aids in the emulsification and absorption of fat and increases the output of bile from the liver.

The gastric secretory function of the patient must be considered when prescribing his diet. All greasy and acid foods must be omitted in cases of hyperchlorhydria. Most fruits increase gastric acidity because they leave the stomach slowly. Vinegar, mustard, horseradish, spices, coffee, cider, lemonade, ginger ale, cocoa, chocolate and alcohol in any form should be omitted. In addition to fried foods and pork, these patients should also avoid goose, duck, sausage, tongue, lobster, and crabmeat. Vegetables such as tomatoes, cabbage, cauliflower, cucumbers, navy beans, radishes and beets are best omitted. Allow fresh well prepared peas, lima beans, puréed corn, carrots and spinach, and asparagus tips.

Patients who have hypoacidity or achylia, on the other hand, will do well with acid fruits, veg-

etables and buttermilk or other acid beverages.

Acceptable desserts may include custards, light puddings, sponge cakes, gelatines and possibly stewed fruits. Ices, ice cream and all sweets may not be well tolerated. Pastries are, of course, out of the question. Individual likes and dislikes should always be taken into consideration.

Since bile remains stored in the gall bladder during the fasting state it is better for patients with gall bladder disease to eat frequently—at least five or six times a day—in order that the flow of bile may be encouraged. Frequent feeding is especially indicated in the presence of hyperchlorhydria. The fact that attacks of colic occur more often during the night may be due to the distention of the gall bladder with bile which accumulates during the fasting period. The last food should be taken just before retiring and some light food at the bedside, so that the patient may eat in case he awakens during the night, is desirable. The liberal drinking of hot or cold water on rising, with meals and between meals helps to dilute the bile.

Cases of well defined chronic cholecystitis, not relieved by medical treatment, should be treated surgically. Mason and Blackford found that one-third of their patients continued symptom-free on dietary and medical management; one-third came to operation three to five years later and one-third were surgical at once. In this paper I am not attempting to establish just when a patient is definitely in need of operation and when he should be treated medically. In many cases, medical treatment is imperative because the patient has some complicating disease which does not permit operation. The risk of serious consequences during medical treatment has been found to be no greater than is the risk in surgery. Many patients need to restrict their diets even after operation because of permanent liver damage.

During an acute flare-up in chronic cholecystitis the diet should be limited to cereal soups, gruels, milk and lime water and stale bread or toast. Simple puréed vegetables and possibly orange juice may soon be added.

During an attack of acute catarrhal cholecystitis it is usually best for the patient to abstain from all food for eight to ten hours though hot tea and dry toast may often be allowed one hour after vomiting ceases. After nausea and pain have entirely subsided, feed first simple gruels,

then toast or bread and butter with hot tea. After the second day add other simple foods.

Conclusions

The diet in chronic cholecystitis should be simple and consist largely of carbohydrates.

Frequent small feedings are desirable in order to stimulate the flow of bile. Overfeeding at any time is likely to cause trouble.

Proteins should be restricted in proportion to the degree of liver function impairment present, yet allowing a sufficient amount to balance nitrogen elimination.

Fats and greasy foods, especially those rich in

cholesterol, should be greatly restricted, allowing only sufficient fat to supply needed calories and vitamins.

Plenty of water should be taken before meals and between meals.

The caloric needs of the patient should be taken into consideration in prescribing a diet and necessary vitamins should be administered in concentrated form if the menu does not contain them.

The patient should be weighed regularly in order to determine the effect of the diet.

In acute conditions fasting for a brief period and further restrictions are necessary.

PRIMARY TUBERCULOSIS OF THE GALLBLADDER*

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ALTHOUGH tuberculosis of the liver and intrahepatic biliary passages is no great rarity, tuberculous cholecystitis unassociated with widespread tuberculous peritonitis is one of the rarest of pathologic findings.

Since 1900, there have been very few references to this subject in the literature in America. It has been suggested³ that the rarity of this condition is due to a special resistance of the organ to the bacillus of tuberculosis, as it has been demonstrated by Hanot and Létienne that very infrequently is the bacillus of tuberculosis found even in the bile from the cystic duct of patients dying from general tuberculosis. However, Sergeant has demonstrated that the bacillus of tuberculosis in the bile of guinea pigs and dogs does not produce tuberculous lesions of the gallbladder unless that organ has been injured or the common duct ligated. It has been suggested that the fat-splitting and fat-dissolving properties of the bile and pancreatic fluid are factors in this resistance, possibly attacking the waxy coat of the bacillus itself.

In 1926, Rankin and Massie reported a case in which tuberculous peritonitis had developed after cholecystostomy for tuberculosis of the gallbladder. They stated that there were fifteen cases

of tuberculosis of the gallbladder reported in the literature. In 1928, Case reviewed the literature on this subject and collected ten cases of what he considered to be primary tuberculosis of the gallbladder. Recently, the condition has come under our observation and we wish to report the following case:

Report of a Case

A man, aged forty-six years, registered at The Mayo Clinic, June 28, 1933. He complained of a series of attacks of pain in the right upper quadrant of the abdomen and of gaseous dyspepsia. The onset of this condition had occurred in February, 1933, five months previously, when an attack of very severe pain in the right upper quadrant of the abdomen associated with nausea and vomiting had developed. This severe pain had lasted for about twenty-four hours and had been followed by a temperature of 105° F., by jaundice, and by weakness. There had been residual soreness in the right upper quadrant of the abdomen for two weeks. The patient stated that he had been well following this attack for the next four months. Then there had been recurrence of the severe pain in this right upper quadrant which had continued with a series of colics in this region for about a week. He had been unable to work for two weeks.

At the time of his admission, however, the patient felt fairly well. His only complaint then was of gaseous dyspepsia following heavy, or fatty foods. He was well-developed and moderately well-nourished. His blood pressure in millimeters of mercury was 120 systolic and 70 diastolic, his pulse rate was 72 beats per

*From the Division of Surgery, The Mayo Clinic, Rochester, Minnesota.

minute and his temperature 99° F. The general physical examination gave essentially negative results with the exception of slight tenderness in the right upper quadrant of the abdomen. Urinalysis likewise gave negative results. The value for hemoglobin was 12.3

The patient's convalescence was uneventful and he left the hospital on the fourteenth postoperative day. It is of interest at the time of his discharge that there was no evidence of pulmonary tuberculosis or of other tuberculous lesions (Fig. 1).

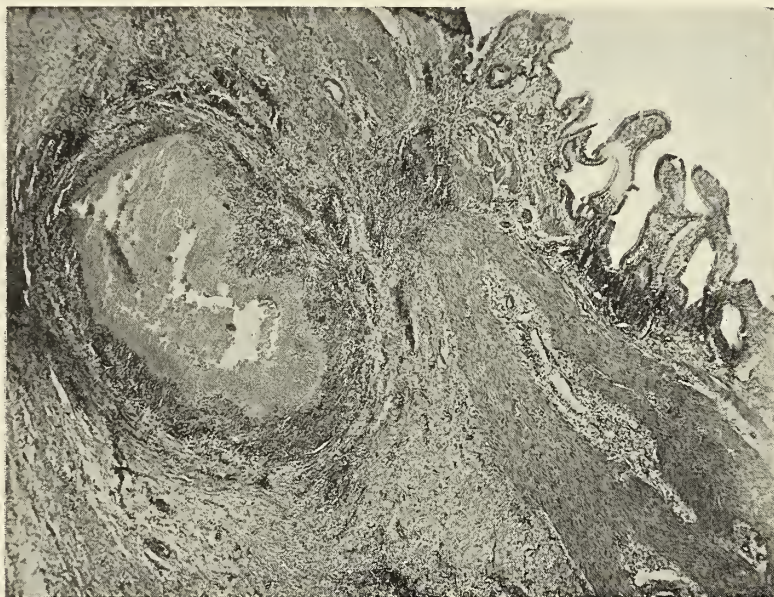


Fig. 1. Tubercle adjacent to mucosa in the wall of the gallbladder.

mg. per 100 c.c. of blood; erythrocytes numbered 4,480,000 and leukocytes 5,800 per cubic millimeter of blood, and the test for flocculation gave negative results. Roentgenologic examination of the gallbladder disclosed it to be nonfunctioning. A diagnosis of subacute cholecystitis with stone in the common duct was made and operation was advised. This was refused and the patient returned home.

He returned to the clinic October 10, stating that since his previous admission he had been troubled with an almost constant distress in the right upper quadrant of the abdomen with occasional sharp pain in that region. There also had been acid eructations and heartburn after rich or fatty foods. There had been no jaundice. The general examination gave essentially the same results as the previous one.

Operation was performed October 11, through a right rectus incision. The gallbladder was subacutely inflamed. It had perforated at its fundus into the liver forming a zone of induration. The common duct was slightly enlarged; it was opened, but no stones were found in the hepatic or common ducts. A small scoop could not be forced through the ampulla into the duodenum. Rather than injure the duct it was not forced. A T-tube was sutured into the common duct to be left in for six weeks. Exploration of the stomach and duodenum gave negative results. Microscopic examination of the removed tissue revealed subacute purulent cholecystitis on a basis of chronic cholecystitis, with associated chronic caseous miliary tuberculosis.

Comment

In a review of the records at the clinic, we found that there were four other cases in which a similar diagnosis had been made. In one instance, the condition was associated with multiple gallstones, and was found in the wall of a chronically inflamed gallbladder. In two other cases, it was associated with tuberculous peritonitis which was limited strictly to the visceral and parietal peritoneum in the right upper quadrant of the abdomen, the process seeming to originate from the diseased gallbladder. The fourth, similar to one of the foregoing, was associated with an inflammatory tuberculous mass in the liver which seemed to originate from a similar pathologic lesion of the gallbladder. These cases on physical examination revealed no evidence of tuberculous lesions elsewhere.

Whether the gallbladder represents the initial tuberculous lesion or is secondary to tuberculosis elsewhere cannot be determined from the data at hand. At any rate, the lesions seem to be primary in the abdominal cavity. The means of

entrance of the bacillus of tuberculosis into the gallbladder is merely a matter of conjecture. It may be carried by the blood stream from a distant focus by the hepatic artery or portal vein, or it may enter from the intestine directly through the bile duct or the gallbladder secondary to tuberculosis of the liver. Tuberculosis of the gallbladder has no clinical entity and cannot be diagnosed, clinically, from the other forms of chronic cholecystitis. Its diagnosis rests wholly on pathologic examination.

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SINUSITIS AND ASTHMA*

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PRACTICALLY all theories of asthma except, perhaps, the modern theory of specific sensitivity, touch at some point on nasal pathology. Such concepts early led to therapeutic attack on the pathology assumed to be present. This was all the more logical because asthma is frequently associated with nasal symptoms, such as occlusion, sneezing, tickling and watery discharge, symptoms now recognized as manifestations of allergy but usually described by the patient as a "cold in the head." There grew up in the early days of rhinology an imposing terminology of disease; inspection of old text books yielded a list of twenty names, all of which evidently referred to allergic manifestations. Treatment, based on the vaguest pathological knowledge, included every type of local application and manipulation that could be applied to the nose; the results were most uncertain and bizarre.

The concept of allergy as a constitutional condition which may be manifested in almost all tissues goes far to explain the association of nasal symptoms with asthma and is accepted widely but not universally as explaining, on the basis of similar etiology and pathology, the undoubted association between nasal disorders and asthma. Such a theory leads logically to attempts at controlling the common factor in the two conditions, whatever it may be; radical sinus surgery becomes a means of last resort and then

only on the indications usually accepted in non-asthmatic patients.

It has also been assumed that the sinus disease causes the asthma. Such a theory leads primarily to the conclusion that all pathological tissue must be removed and ultimately to a great deal of operating with results that are often dubious. Figures vary greatly but definite reports of permanent cure through surgical therapy alone are so infrequent that the above theory is not tenable.

Modern classification of inflammatory diseases of the nose and accessory sinuses recognizes acute and chronic suppurations (empyemata), non-suppurative or hyperplastic lesions (acute and chronic catarrhal), and a mixture of these two. The non-suppurative conditions, so-called hyperplastic rhinitis and sinusitis, characterized by thick, grey, edematous and polypoid membrane in nose and sinuses, are especially important because of their frequent occurrence and perplexing because of the difficulty in assigning them their proper rôle in the production of asthma. Hansel¹ feels that such hyperplastic tissue is the end result of nasal changes which started as vasomotor or hyperesthetic rhinitis and progressed through the so-called acute and chronic catarrhal stages to the terminal condition described above. He also states that all hyperplastic lesions should be considered allergic until proved otherwise.

Hyperplastic tissue, because of interference

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with drainage and ventilation by edema, is especially susceptible to secondary infection. This is clinically important in its relation to asthma and at the same time modifies the microscopic picture of allergy by the addition of characteristics essentially inflammatory in type.

That hyperplastic tissue may, in the absence of suppuration, carry infection, is not so generally recognized. Tunis¹² reports finding streptococci in slides of antral membrane (postmortem) and Kistner² has found streptococci in slides made from operative material and in cultures from ground-up membrane. The latter expressed the belief that hyperplastic tissue is the end result of low grade chronic infection superimposed on an allergic basis. Mullin⁵ remarks that infection in the lining of a sinus may be more important than free pus in its cavity.

Adequate experimental and clinical proof is at hand that infection in the upper respiratory tract may have a direct effect on the tracheobronchial tree, either by aspiration, contiguity or through blood or lymph channels with the final production of peritracheal and peribronchial fibrosis with its predisposition to chronic bronchitis, pneumonia and bronchiectasis, the mechanism for which was demonstrated experimentally by Mullin^{6, 7, 8} and by McLaurin.⁴ These complications are particularly undesirable in asthmatics.

Whether or not long existing foci, suppurative or non-suppurative, render the patient sensitive to his own infection by the production of an allergy dependent on bacterial sensitization is a moot question in connection with which Kolmer³ says: "Whether or not bacteria and their products may produce sensitization and allergic reactions is still in doubt; personally I believe that they may and that some cases of asthma may be due to allergy caused by streptococci, staphylococci and other bacteria growing in the upper and lower respiratory system, including the tonsils, abscessed teeth and nasal respiratory system.

Frank suppuration in the nasal cavities is usually recognized without trouble and should be dealt with on the indications that would be accepted in the non-asthmatic patient. Difference of opinion exists, however, concerning the treatment of the non-suppurative (hyperplastic) lesions, capable observers reporting good results

from their removal and others obtaining very little, if any, result from such procedure.

It should be borne in mind in this connection that diffuse hyperplasia, with or without polyposis, may be produced by chronic infection, allergy, or a combination of these factors and may or may not harbor infection. Casual inspection of the nasal chambers and X-ray studies with opaque media will demonstrate the presence or absence of such pathology. Whether it is entirely an allergic reaction, in which surgery is not indicated (removal of obstructing polypi excepted), or whether it is due to chronic infection or to allergy plus infection constituting, according to some theories, a focus of infection which should be removed, is a problem belonging peculiarly to the rhinologist.

A rhinologist's study of such a case should be comprehensive and may be completed without being cumbersome or too annoying to the patient. The usual inspection should be done and the sinuses transilluminated. Cultures should be taken from the spheno-ethmoidal area and nasopharynx, looking especially for streptococcus. Vaccines should be made from all organisms present and skin sensitization tests made to discover to which, if any, the patient is sensitive. Differential cell counts should be made on nasal smears, to determine the percentage of eosinophiles and neutrophiles; eosinophilia may be as high as 75 per cent in allergy. X-rays should be taken after the instillation into the sinuses by suction of an opaque medium. After these have been examined all further work may be done at the expense of one antrum puncture. At this puncture antroscopy may be done; this usually gives us complete information as to the presence of hyperplasia, polypi, pus, etc. Sterile salt solution is injected and withdrawn, half to be cultured and half to be centrifuged for the ordinary differential cell count to determine the relative percentage of eosinophiles and neutrophiles. Finally, if the first plates were not conclusive a little brominol may be instilled into the antrum through the needle and a single plate made to map exactly the mucosa. Such studies give us the bacteriology and cytology of the nose and accessory cavities and help us to recognize and evaluate the factors of allergy and infection. Taken in conjunction with the skin tests and

results of treatment, they aid us in deciding whether or not operation is indicated.

What shall be the treatment of a non-suppurative focus of infection in intrinsic asthma? In answering this question in any given case one must consider not only the tendency of such lesions to render the patient susceptible to repeated acute head infections and permanent lesions in the lower tracheobronchial tree but also the possibility of such a focus causing the asthma by the production of a bacterial allergy. Finally one must endeavor to determine the probable effect of operation upon these various factors.

Theoretically the surgical treatment of such a condition should lessen the incidence of infection in the respiratory tract; my experience has been that the local symptoms, obstruction, discharge and the tendency to acute head infections are frequently improved and improved enough so that the operation has seemed justified. Such improvement varies in its permanency and completeness but is of sufficient degree to warrant its serious consideration in selected cases.

Consideration of the effect upon intrinsic asthma of the surgical treatment of a non-suppurative focus of infection enters debatable ground and involves the question of bacterial allergy. Equally competent and careful observers hold, on the one hand, that foci of infection have no bearing on asthma, their treatment being therefore futile, and on the other hand that in certain types of asthma, especially intrinsic asthma, foci of infection may produce a bacterial allergy responsible for the asthma and should, therefore, be eliminated as completely as possible. Ample support may be found for either position. Rackemann and Tobey,⁹ reporting on 1,074 cases followed in the asthma clinic of Massachusetts General Hospital, found more foci of infection in intrinsic than in extrinsic asthma, that the results of treatment of extrinsic asthma were better when infection was not present, that the presence of infection in nose or throat bears little relation to the outcome of the asthma and that the elimination of foci is disappointing so far as the asthma is concerned, a permanent cure by such methods being obtained in only 5 per cent of cases.

In similar vein is a late report from Toronto¹³ giving the end results of radical antrum operations in thirty-one cases of bronchial asthma. All experienced considerable relief for from two

weeks to six months (average four months), but in only two cases were satisfactory results permanent enough to justify the operations.

Very different is the report of Smith¹⁰ of Grand Rapids. This author finds definite disease in the nose and sinuses in 82 per cent of his cases. Radical operations resulted in complete cure in 75 per cent of cases and marked improvement in 26 per cent. He concludes that a large percentage of cases of asthma is due to chronic nasal sinus infection, that between 70 and 80 per cent of these patients can be cured by radical operation and that the unsatisfactory results of surgery in asthma are due to its incompleteness.

Smith,¹¹ of the Cleveland Clinic, discussing a series of 314 cases, found chronic sinus infection, usually catarrhal (hyperplastic) in type, in every case of intrinsic asthma. Forty-four sinus operations were done in such patients with a subsidence of symptoms of from two to four months, lessened severity on recurrence and improvement in general health. While he does not unreservedly recommend such operations he feels that the patient may be definitely benefited thereby.

It is difficult to reconcile such divergent views and results. Failure to control allergic factors, especially in extrinsic asthma, will certainly doom to failure any operative measures because the new-formed mucosa will be just as allergic as that removed. It is rather common practice, judging from the literature, to accept negative results of routine skin tests as ruling out allergy. That such tests may be misleading is well recognized as is the fact that the successful detection and elimination of the offending allergen often demands much time and personal effort on the part of the physician.

That some of the unsatisfactory results reported may be due to failure to recognize and eliminate allergic factors, is suggested by a study of case reports in which x-ray evidence of hyperplasia and negative skin tests have been accepted as adequate operative indications. It is well to remember that either allergy or infection may produce clinically similar lesions of hyperplasia with or without polyposis and that it is essential to recognize and separate these factors to avoid useless operation in purely allergic cases. The repeated study of the cytology and bacteriology of the nose and sinuses, as outlined above, to-

gether with the usual clinical and x-ray examinations, will be of help and are to be recommended.

Advocates of the surgical treatment of infection attribute its failure to inadequate technic and incomplete removal of foci. That such foci are not always amenable to surgical removal by any means is a fact that sometimes escapes observation. Witness the variations in the ethmoid, some of which are surgically inaccessible by any route.

In my own experience radical sinus surgery has not resulted in the permanent cure of asthma. The patients have been relieved, occasionally almost completely, for from one to six months; in all, however, recurrence has taken place in variable degrees of severity, some milder, some more severe. I cannot, therefore, as a result of my own experience recommend the surgical treatment of non-suppurative foci of infection in intrinsic asthma as a permanent cure for this most baffling disease.

Conclusions

1. Either allergy or infection or both may be responsible for nasal hyperplasia.

2. Every effort should be made to recognize the presence of and evaluate the relative importance of these two factors.

3. No patient with asthma should be submitted to operation until every effort has been made to eliminate or control all allergic factors.

4. Suppurative lesions in the nose and accessory sinuses of asthmatics should be dealt with on the indications ordinarily recognized in non-asthmatics.

5. The removal of non-suppurative foci of infection from the nose and accessory sinuses in intrinsic asthma will usually result in marked and fairly permanent improvement, but not cure, in their local manifestations, obstruction, discharge and acute head infections and in improvement or cessation of the asthma which, however, is not permanent, the period of freedom from attacks lasting from one to several months, the average being four to six. Operation should not be offered in such type of case as a cure for asthma.

6. Non-suppurative foci of infection in the nose or accessory sinuses in intrinsic asthma may occasionally be treated surgically in selected cases in an effort to indirectly affect the asthma by improving the general condition of the patient, by lessening the tendency to involvement of the tracheo-bronchial tree, or by removing local conditions which predispose to the so-called "trigger attacks" of acute head infection and consequent asthma.

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CARCINOMA OF THE LARGE BOWEL*

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THE American Society for the Control of Cancer has been making an effort to stimulate statistical study of cases of carcinoma, and it is for this reason the hospital cases of carcinoma of the large bowel were studied in the city of Duluth. This study, which aims to be a critical survey, covers a group of 110 surgical cases of malignancy of the colon and rectum seen at St. Mary's and St. Luke's Hospitals in Duluth during the nine years from January, 1924, to February, 1933. Only surgical cases were included as there can be no doubt as to the true nature of the condition. In all cases either a biopsy or the gross specimen proved the presence of carcinoma. Of the group, 104 cases have been traced and six were not traced. Five of the patients not traced have been considered dead for various reasons.

Sex and Age

There were fifty-three females and fifty-seven males, a ratio of practically 1:1. The average age of fifty-five and six-tenths years was definitely within the cancer period. However, both extremes of age were represented, the youngest patient being twenty-six and the oldest eighty-five years of age. Distribution of cases as to age of the patients by decades of life was as follows: twenty to twenty-nine years, one patient who was twenty-six years old; thirty to thirty-nine years, nine patients; forty to forty-nine years, thirty; fifty to fifty-nine years, twenty-six; sixty to sixty-nine years, twenty-seven; seventy to seventy-nine years, sixteen; eighty to eighty-nine years, one patient who was eighty-five years of age. This distribution of patients throughout the entire span of life emphasizes the necessity for each physician to be "cancer-minded."

Symptoms

In ninety-eight cases it was possible to ascertain the duration of symptoms prior to hospitalization. The longest duration of symptoms was

three years while the average duration was eight months. Six patients entered the hospital with acute intestinal obstruction; they never had had any previous complaints referable to the bowel. On the first admission to the hospital practically all the symptoms pointed in some degree to gastro-intestinal disturbances. The complaints were as listed in the accompanying table.

	Cases
Abdominal pain (various locations).....	65
Constipation (recent).....	63
Loss of weight	53
Blood in stool (gross).....	51
Diarrhea (recent).....	32
Gastric distress with vomiting and anorexia.....	39
Pain in rectum.....	24
Weakness	18
Abdominal mass (found by patient).....	12
Ribbon stools	11

The insidious onset of a functional disturbance of the bowel, which is at all out of the ordinary for the individual and is associated with abdominal pain, blood in the stools or loss of weight, is adequate reason for thorough investigation of the intestinal tract to prove or disprove the presence of malignancy.

Previous Operations

Eleven patients had had operative procedures for supposed conditions other than carcinoma but there is every reason to assume that the malignancy caused the symptoms, because the primary complaints continued after operation and subsequent hospitalization became necessary in due time for further study. This observation is not new but is worthy of reëmphasis at the present time.

Hemorrhoidectomy, "treatment of piles," and fistulectomy had been done in a total of six cases, appendectomy in two, cholecystectomy in one case, severance of adhesions for partial intestinal obstruction in one, and right inguinal herniotomy in one. Inadequate study of the case was responsible for failure to make a correct primary diagnosis.

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Diagnostic and Laboratory Procedure

It was almost astounding to see what help was obtained from minor diagnostic aids. Of the twenty-eight rectal examinations that were done in the cases of this series, twenty-seven yielded a diagnosis of carcinoma of the rectum or rectosigmoid. Proctoscopic examinations were done eighteen times and in each the growth was visualized sufficiently to warrant a positive diagnosis of malignancy. In other words if a lesion is present it will rarely be missed by either rectal or proctoscopic examination.

In thirty-eight cases of lesions situated in the bowel beyond the rectum or rectal bulb, roentgenograms were made and a diagnosis of carcinoma was made in thirty-six cases. Of the two cases incorrectly diagnosed, one, a case of carcinoma of the cecum, was diagnosed abscess and the other, a case of carcinoma of the sigmoid, as merely a sharp angulation of the sigmoid. The natural conclusion is that roentgenography of the colon is an extremely important diagnostic aid.

Blood counts were taken in sixty-two cases and these revealed a sufficient grade of anemia to be significant in fifty-four cases. In all the cases of carcinoma of the cecum, anemia of moderate degree was present.

Preoperative Diagnosis

The preoperative diagnosis was not always correct. Of the entire group the preoperative diagnosis was correct in eighty cases and incorrect, or not definitely given, in thirty (27 per cent). Carcinoma of the large bowel might have been considered in a small number of the undiagnosed cases, but was not stated as the preoperative diagnosis. It may have been implied in such a preoperative diagnosis as intestinal obstruction or in a mere exploration. In the cases of acute intestinal obstruction, however, operation was urgent and no time was permitted for study. In the remaining cases incorrectly diagnosed, inadequate study was definitely responsible. The number of faulty diagnoses have been less frequent in the last few years.

The incorrect diagnoses were as follows: In nine cases of carcinoma of the cecum the diagnosis was appendicitis or abscess in five cases, cholecystitis in one case, cholecystitis and ovarian tumor in one and tumor of the abdomen in two cases; the diagnosis in two cases of car-

cinoma of the hepatic flexure of the colon was cholecystitis with stones in one case and exploration of abdominal tumor in the other; the diagnosis in three cases of carcinoma of the transverse colon was acute appendicitis in one case, tumor of the omentum in one, and ruptured duodenal ulcer in the third; in one case of carcinoma of the splenic flexure of the colon the diagnosis was merely intestinal obstruction; and in fifteen cases of carcinoma of the sigmoid and rectosigmoid, the diagnosis was multiple fibroids in three cases, ovarian tumor in two, diverticulitis in one case, acute perforation in one, carcinoma of the pyloric end of the stomach in one, cholecystitis with probable stones in one, intestinal adhesions with obstruction in one and intestinal obstruction without etiologic specification in five cases.

Situation of Lesions

The lesions were found in every segment of the large intestine, but about three-fourths of them were in the left half of the colon and rectum. They were situated as follows: in the sigmoid in thirty-eight cases (34 per cent); in the rectum in thirty-three (30 per cent); in the cecum in fifteen (13 per cent), an unusually large number; in the rectosigmoid in ten (9 per cent); in the transverse colon in six (5 per cent); in the hepatic flexure of the colon in three (3 per cent); in the splenic flexure in two (2 per cent); in the descending colon in two (2 per cent), and in one case there were multiple lesions with involvement of the cecum, rectum, and sigmoid.

Type of Operation

A composite picture of the operations carried out in the 110 cases studied is shown in Table 1. The group is too small to carry any significance as to relative merits of each operation, and although the operative procedures were made to fit the individual case, it is easily seen that operations on the large bowel carry a high risk. Operations on the right half of the colon were especially hazardous whether primary ileocolostomy or primary resection was done. Most surgeons prefer a two-stage operation for this type of lesion. The entire mortality of 38 per cent was extremely high, but it must be remembered that seven of the deaths occurred in the twelve patients who came into the hospital with acute obstruction which required an immediate operation.

TABLE I. TYPE OF OPERATION WITH MORTALITY

Type of operation	Operations	Deaths in hospital
Exploration	11	2
Colostomy	61	14
Kraski and perineal resection	18	6
Primary resection of cecum	8	6
Mikulicz operation on sigmoid	9	3
Ileocolostomy	3	3
Mikulicz operation on transverse colon	3	0
Resection of sigmoid or recto-sigmoid and colostomy	6	3
Secondary resection of sigmoid and rectosigmoid	6	0
Enterostomy or cecostomy	4	0
Resection of transverse colon	2	1
Resection of hepatic flexure	2	1
Mikulicz operation on hepatic flexure	1	1
Mikulicz operation on splenic flexure	1	1
Mikulicz operation on descending colon	1	0
Colectomy	1	1
Total	137	42

to the following miscellaneous conditions: ruptured gastric ulcer, abscess of the liver, parotitis, exhaustion, anaphylactic shock after administration of glucose intravenously, cardiac failure, and infection of the wound.

Duration of Life After Operation

Of the group which had successfully undergone palliative operations or resection of the tumor, fifty-seven patients have been traced to January, 1933. Thirty-five patients have died, seventeen of whom had had only palliative operations and eighteen removal of the tumor. The duration of life of the seventeen patients on whom palliative operation only was performed was one to six months after operation in eight cases; six months to one year in five, one year to eighteen months in no cases, eighteen months to two years in three, and two years to twenty-six months in one case. The average length of life after operation for these patients was nine months. The longest life after palliation was that of a patient who had had a colostomy for a carcinoma of the rectum and who lived fairly comfortably for twenty-six months. This case alone signifies the value of palliation and it behooves the surgeon not to close the abdomen as an exploration if some palliative procedure can possibly be carried out.

The average length of life of the eighteen patients who died and on whom resection had been performed was twenty-one months, and the greatest length of life was seventy-six months. Death occurred in one to six months after operation in three cases; in six months to one year in six, in one year to eighteen months in four, in eighteen months to two years in one case, in two to three years in one, in three to four years in one, and in six to seven years in two cases. Of the two patients who lived seventy-two and seventy-six months respectively, one had had a resection of the sigmoid and the other a resection of the rectum. In all the patients in this group, with the exception of one who had had a resection of the rectum and who lived two years after the operation, death was due directly to the malignant condition.

Twenty-two patients who were still living in January, 1933, were traced. Of these, five were in poor health and rapidly failing because of recurrence or extension of the malignancy. Most of these had had palliative operations only.

In all of these cases, with one exception, conservative operative measures were carried out. The mortality rate by years is given in Table 2. There is every reason to believe that the helpful preoperative measures, which aim at decompressing the bowel, and peritoneal vaccination, have aided in reducing the mortality in the last few years. In addition, correct preoperative diagnosis is essential to a low postoperative mortality.

TABLE II. YEARLY MORTALITY

	Year										
	1924	1925	1926	1927	1928	1929	1930	1931	1932	Jan., 1933	
Patients operated on	7	6	8	12	13	13	16	16	16	3	
Number of deaths	3	3	4	7	5	5	6	5	4	0	
Per cent	42	50	50	58	38	38	37	31	25	0	

Causes of Operative Mortality.—Peritonitis was first of the causes of death after operations on the large intestine; pneumonia and ileus were next in order, and fatal pulmonary embolism was unusually frequent in this series. The operative deaths in this series were due to peritonitis in fourteen cases, bronchopneumonia in nine, ileus in six, fatal pulmonary embolism in four, postoperative shock in two, and in one case each

Seventeen appeared to be in good health, all of whom had had resection of the tumor. Three of the seventeen who were in good health had lived six months to one year after operation, two one year to eighteen months, two eighteen months to two years, two two to three years, three three to four years, one patient had lived four to five years after operation, and three patients five to six years. The greatest length of life was one patient who has lived sixty-six months after operation without any evidence of recurrence.

Summary

One hundred ten cases of malignancy of the colon and rectum have been reviewed. A plea is made that the physician become cancer-minded in all cases, whatever the age of the patient in which symptoms of recent change in bowel habit and abdominal complaints are present. Valuable

diagnostic aids, such as proctoscopic examination and roentgenography of the colon, are available in making a diagnosis of lesions of the rectum or colon. The essential requirements for a lowered mortality rate are accurate preoperative diagnosis and energetic preoperative management. This is exemplified by the lower mortality rate in the last few years.

The average life after a palliative operation is only nine months in this series; after resection, twenty-one months. Two patients lived for between six and seven years following resection. In this series there are three patients who are living now more than five years after operation and who have no symptoms of recurrence.

In this series it was not possible to compare duration of life in the cases in which resection had been performed with the grade of the tumor as is deemed of such important prognostic value by Rankin.

PRACTICAL EXPERIMENTS IN WHAT ACTUALLY CONSTITUTES A GOOD CLINICAL RECORD*

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WORD descriptions of disease conditions exist from early historic times. The doctor has found it necessary to keep a record of his patient as a spur to his memory even though such a record be only a few words in length. His impressions of an interesting, unusual illness are likely to overbalance his remembrance of a dozen less striking cases of a similar type. With the coming of modern scientific medicine, the necessity of recording an increasing number of quantitative facts in the form of laboratory tests and instrumental readings have made adequate notation indispensable. Case records can no longer be considered to be essential only for the purpose of teaching, writing and research, but must also be kept if orderly and systematic study is to be carried out with respect to the routine practice of medicine.

Accuracy of Facts in Medical Records

The patient's record is made up of the sum total of all the facts recorded in it. Even though such facts are noted quite completely, the record will present a true picture only if these facts have been recorded accurately.

In general it can be said that the facts in a medical record range from those which can be established with comparatively certain accuracy, such as sex, weight, height, etc., to those which can be established only within zones of considerable variation, such as family history, symptomatology, et cetera.

The difficulty in obtaining accurate facts is due in part to the lack of adequate definitions. For instance, to obtain a consistent weight value it would be necessary to know if the weight should be taken with the patient nude or clothed, while to obtain a consistent height it would be necessary to know if the height should be taken with

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or without shoes. If variations of height and weight were to be studied, other variables such as time of day, position of subject, and accuracy of instruments would have to be recorded. The entire problem of medical nomenclature arises from this need for definition.

The accuracy of any recorded fact in the history may vary not only with the existence or the lack of adequate definition, as dictated by the character of the fact itself, but also with respect to certain other variables: Who asks the fact? How is the question asked? Is the patient responsive? What is his mental or physical condition at the time of the questioning?

There are some facts in the history which a clerk can obtain almost as well as a nurse or doctor. When a clerk is used, however, one must be constantly on guard for a discrimination by the patient against the questions of a lay person. For instance, the doctor occasionally obtains a difference in age, occupation, or financial status of the patient which the clerk can not elicit even after careful questioning. No one, so far as I know, has systematically studied the difference between the answers obtained by a senior medical clerk, an intern, a resident or a staff doctor taken independently on the same patient. A few experiments along this line have been tried by the author with most disturbing discrepancies. They indicate that there are frequently considerable variations in the consistency of the answers given by a patient, which heretofore the physician has never considered as possible variables.

For instance, two staff clinicians attempted by independent efforts and by combined efforts employing both direct and indirect questioning, to elicit the true description of the type of abdominal pain felt by a certain patient suffering from peptic ulcer. After persistent trials over five or six days, the patient's story finally became consistent. Whether the consistent description finally arrived at represented the accurate description, there was no way to verify. It is certainly true, however, that if this patient had been questioned in the routine manner, the accuracy of the first description as given by the patient and placed on the record would never have been verified.

Responsibility for Obtaining Good Facts

The responsibility for obtaining accurate facts must be shared by the administrative, the nursing

and the medical staff. In general, it is wise to place as much burden upon the administrative clerical force involved with the admittance, discharge and record room as possible, and place the burden of all other items, except those which can be done only by the staff, upon nursing. This minimum notation by the hospital clinical staff should involve an entrance statement which checks the findings of the intern, staff progress notes, and a discharge statement of instruction to the patient together with the final diagnosis. It is not possible for nurses, interns, or clerks to take over these functions for the clinical staff except inasmuch as they might write down what is directly dictated. A hospital which can not bring about record consciousness in its clinical staff to the point where it will carry out these minimum requirements, can not expect to obtain worthwhile records either for the purposes of scientific study or for the practice of good clinical medicine.

Principles Involved in Collection, Tabulation and Use of Medical Records

All medical records can be divided into two general types, the clinical record and the medical data sheet. Any other type represents a compromise between the two extremes. The clinical record is defined as a sequential statement of the important facts about a patient's condition and physical findings, while a medical data sheet is defined as a record form adapted for the notation of the patient's history and physical findings suitable for statistical tabulation and analysis. The clinical record must fit the needs of the busy doctor in his relationship with his patient while the medical data sheet must fulfill the qualifications of a scientific record with respect to completeness, accuracy, and ease in notation and tabulation of facts. The primary consideration in good history-taking, from the standpoint of the physician, is to obtain the *essential facts* at the expense of the non-essential. Dr. Raymond Pearl (1921) expresses the dissatisfaction which the statistician feels toward the clinical record:

"From the standpoint of scientific routine record-taking, case histories are most glaringly defective in what they fail to record about the patient. It is by no means impossible to find case histories that fail to record the sex of the patient, while any indication of what kind of person the patient was, in the common sense of the word, whether fat or lean, white or col-

Record Requirements	Clinical Record	Medical Data Sheet
1. Continuity	Continuity in a prime essential. It is largely obtained by rough ordering and the elimination of non-essential information.	Continuity is obtained solely through order and fixation of places for given facts in the record.
2. Order and sequence	Only rough order is necessary in the clinical record except for a few basic facts about the patient which demand fixation of places on the record. Arrangement of sheets in the patient's record helps sequence.	Order arrangement and sequence are essential. They are obtained by fixation of places on the record for given facts and the arrangement of sheets in the patient's record.
3. Conservation of notation time.	It is absolutely essential to conserve the time of the doctor. This end is gained first by shifting all possible record work upon clerks or nurses, and secondly, by omitting the recording of all non-essential medical data.	It is desirable to conserve time but if it is not possible to do so except at the sacrifice of completeness in the notation of facts, conservation of time becomes a matter of cost.
4. Condensation in presentation of facts recorded.	A condensed and itemized form is desirable.	A condensed and itemized form is desirable.
5. Ready yield of information.	While this is desirable for essential information it is not necessary for information which is of minor importance in the patient's condition.	This is essential for all facts on the record, no matter how minor.
6. Accuracy.	Accuracy is desirable but is rarely checked.	Accuracy is desirable but is not frequently checked except for completeness and for apparent errors.
7. Legibility.	Legibility is essential.	Legibility is essential.
8. Expansibility and adaptability.	The ability to expand and adapt a record is very essential to the physician.	The ability to expand and adapt records is desirable but can be obtained only with difficulty since it is impossible to prepare a blank form which can completely satisfy every need for the whole history and physical examination.
9. Completeness of notation.	A reasonably complete summary note of the more important items in the record usually suffices. This can be done by the staff after discharge of the patient.	Completeness of notation is essential in all details which are desired for tabulation. This can be accomplished only by close clerical check before the patient has departed from the doctor's care.

ored, rich or poor, young or old, et cetera, is all too frequently kept a deep secret from any subsequent reader of the history. Again, even in the special medical portions of the history the writer forgets, with almost unbelievable frequency, to make any record of highly important facts.

"The root of such difficulty apparently lies in the method by which case histories are written. The general scheme or outline which a history is to follow resides, far too often, in the head of the history writer, and there only. And heads, especially of human beings, do vary so! The remedy is patent. Any hospital or service that desires to put its clinical records on the most scientific basis will, as a first step, draw up and have printed a series of standard history forms, which will cover not merely general routine facts common to all diseased conditions, but special forms as well, for at least all of the more frequently occurring conditions. These blank forms will contain definitely indicated spaces in which some statement of fact absolutely must be recorded in every single case."

Perhaps a tabulation of the principal similarities and dissimilarities between the clinical record and the medical data sheet will serve to make clear the difficulties involved in attempting to fuse these two types of records.

This tabulation of essential differences and similarities between the purely clinical record and the medical data sheet brings out the fact that the important requirement from the standpoint of the clinician is to obtain continuity in the record, which when taken in conjunction with the necessity for expansibility and adaptability of the record to the multitudinous conditions and findings in the patient, necessitates elimination of the collection of non-essential information in the record.

Quite the reverse is true of the medical statis-

tician or the clinician who desires to study his records for purposes of scientific research. He immediately finds that it is difficult to extract facts from the clinical record and that in a great many instances they have not been recorded completely. The necessity for noting negative information is particularly overlooked. To quote from Dunn (1927):

"Completeness to the clinician signifies notation of every detail pertaining to the positive facts about the case. Completeness to the statistician means positive

and negative information for every single item that is of sufficient consequence to enter into the picture of the disease. It is impossible to apply the laws of probability unless the true probabilities are known.

"If negative and positive information are both known for a series of patients, a 'master tabulation' can be made from the data. For illustration, 843 patients studied by Dr. H. A. Young at the Brady Urological Institute were grouped by me into two classes, the first with moderately enlarged prostates and the second with extremely enlarged prostates. In each instance the history of retention and the type of onset were known.

TABLE A

	No of Cases	Retention	No Retention	Sudden Onset	Gradual Onset
Moderately enlarged	780	(1) 50%	(3) 50%	(5) 7%	(7) 93%
Extremely enlarged	63	(2) 56%	(4) 44%	(6) 15%	(8) 85%
Total	843				

TABLE B

	No. of Cases	Retention		No Retention		Total
		Sudden Onset	Gradual Onset	Sudden	Gradual Onset	
Moderately enlarged	780	(1) 5%	(3) 45%	(5) 2%	(7) 48%	100%
Extremely enlarged	63	(2) 13%	(4) 43%	(6) 2%	(8) 42%	100%
Total	843					

"Tabulation A has taken just as much space as B. However, there are certain questions which can not be answered by A that can be by B. These may be listed as follows:

Table A (Cell No. Noted)	Possible Questions	Table B (Cell No. Noted)
	Percentage of	
1	Retention, moderately enlarged.....	1 and 3
2	Retention, extremely enlarged.....	2 and 4
3	No retention, moderately enlarged.....	5 and 7
4	No retention, extremely enlarged.....	6 and 8
5	Sudden onset, moderately enlarged.....	1 and 5
6	Sudden onset, extremely enlarged.....	2 and 6
7	Gradual onset, moderately enlarged.....	3 and 7
8	Gradual onset, extremely enlarged.....	4 and 8
	Retention and sudden onset, moderately enlarged.....	1
	Retention and sudden onset, extremely enlarged.....	2
	Retention and gradual onset, moderately enlarged.....	3
	Retention and gradual onset, extremely enlarged.....	4
	No retention and sudden onset, moderately enlarged.....	5
	No retention and sudden onset, extremely enlarged.....	6
	No retention and gradual onset, moderately enlarged.....	7
	No retention and gradual onset, extremely enlarged.....	8

"Eight additional questions are evident in master Table B which have not been and can not be answered in Table A. It is obviously impossible to form Table B unless all information, both negative and positive, is known on each one of the 843 individuals."

Certain sheets in the patient's record are essentially data sheets, others are clinical records, and still others are a fusion of the two types of records. Almost every type of institution has some sort of a sheet for registration and discharge data which can be considered to be a data sheet as it has been defined above. Admission and discharge information, together with provisional and final diagnosis and condition on discharge are usually assembled on one sheet. This is a logical combination, since these facts are the sum total of what is desired for indexing by most hospitals, and since it facilitates indexing by bringing together in one place all elements to be indexed. Other records used as data sheets are the clinical, laboratory, temperature, and special study forms. The sheets, which are usually in the form of the clinical record, are the general history and physical examination, progress notes, nurses' notes, and x-ray reports. The group of records which are midway between the clinical record and data sheet are those used by special departments, such as pathological reports, surgical and anesthesia records, etc.

There is no reason why any purely clinical record can not be made into a data sheet when it is desirable to study certain kinds of disease conditions. For instance, a great deal of effort has been expended by the Association for the Prevention and Relief of Heart Disease (1922) in establishing and attempting to popularize an elaborate data sheet for cardiac conditions. Even

though this association was backed by considerable medical opinion, it did not completely succeed in obtaining the adoption of its record. Certain data sheets backed by the American College of Surgeons and the American Medical Association, in particular their forms for recording fractures and for periodic health examination, have enjoyed a moderate success.

Dunn and Rockwood (1928) *Archives of Internal Medicine*) made an effort to throw the more important facts in the general history and physical examination into a data sheet. In spite of the ease of notation of negative facts their record obtained no popularity, due to the feeling that much of the negative information gathered was non-essential. A study of 584 of these records which were taken on patients at the Maryland University Hospital from November, 1927, to September, 1928, showed conclusive evidence of considerable improvement in the determination of the actual facts obtained. In the evaluation of their record, as shown in the accompanying table, a history and physical examination record was called good if it was complete in every detail or very nearly every detail of the printed form, fair if it was complete except for errors in not more than two or three sections of the record, and poor if it contained many mistakes and omissions resulting in an accumulation of data of about the same order of completeness as that obtained in the average clerical record.

November, 1927-September, 1928							
	Good		Fair		Poor		Total
	No.	%	No.	%	No.	%	
Taken in Department of Medicine	81	29	98	35	99	36	278
Taken by other departments	17	6	112	36	177	58	306
Total	98	17	210	36	276	47	584
For November-December, 1927							
	Good		Fair		Poor		Total
	No.	%	No.	%	No.	%	
Taken in Department of Medicine	42	68	16	26	4	6	62
Taken by other departments	9	20	28	64	7	16	44
Total	51	48	44	42	11	10	106

During the experiment there was supervision over the records by one of the staff in the Department of Medicine for the time period of November and December, 1927, while in the other departments there was no supervision at any time. It is interesting to observe that completeness of notation in a form record of this type could be obtained only two-thirds of the time even with close supervision of an interested staff member.

As a consequence of this experiment, the conclusion was reached that it is futile to attempt to better the clinical record by introducing a record form unless the staff members are willing to supervise the record taking in order to obtain data suitable for tabulation and research. It is an open question whether students should be trained by letting them fill out forms as a substitute for a clinical history. It is certainly true that the art of where to expand a history and how to question the patient in order to get at essential facts about the patient's history, and the ability of the questioner to expand and frame his questions so that they produce correct and fruitful answers, will not be obtained by the use of blanks. At the same time, it is probable that a certain amount of fixed order obtained by printed forms would result in somewhat better records and in developing an orderly, systematic approach by the student.

It is to be hoped that some compromise between the data sheet and clinical record can eventually be adopted rather widely throughout the country, at least with respect to the routine history and physical examination. If this were possible, corresponding records in the various special departments could be developed which would dovetail with the general history and physical examination sheet. It is not to be expected that data sheets will ever replace the clinical record forms, although there will be more and more modifications of clinical records to meet partially the requirements of the data sheet. Let there be no illusion, however, that the clinical record can ever be used satisfactorily for the extraction of information for study. This process is expensive and invariably results in information totally inadequate for statistical study. In a sys-

tem involving nothing but clinical records, a physician who wishes to study epilepsy, for instance, should construct a data sheet, collect records upon his epileptic patients, and fill out an approximately equivalent number of data sheets on non-epileptics for the sake of control. He should carry on such a study until he has sufficient data for the statistical analysis which he desires to conduct.

It would be highly desirable for any physician to have at his command a considerable variety of data sheets—at least one for each specialty of medicine, so that when he happened on an unusual or rare case he could systematically go through and fill out all such data sheets and present to the current medical literature case reports which would be truly complete and capable of statistical treatment. If a sufficient number of such reports were published to make it possible to study the rare disease from the quantitative standpoint, definite progress would be made in medical knowledge.

Physical Form of the Patient's Record and Cross-Indexing

The physical form of the patient's record, together with its filing and indexing, is important, but can not be considered in detail in this paper.

Most institutions have adopted the unit system of filing and those hospitals which bind their records in volumes are steadily becoming less in number. Most hospitals are adopting a single registration number for the patient, no matter how many readmittances he may have had to the hospital or to the Out-Patient Department. An identity number for the individual and a distinguishing sub-number for the particular admission should be an essential part of every hospital record system.

Adequate cross indexing methods which will make available the content of the patient's record to the physician do not exist. The solution of this problem will probably result only when modern tabulating machinery has been adapted to cross indexing methods. Experiments along these lines are being conducted in several places throughout the country at the present time.

OBSTETRICAL ANALGESIA*

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TO preserve life and to alleviate suffering have ever been the idealistic objectives of the medical profession, and seldom do the paths that point to these objectives diverge. Due fundamentally to a universal shifting of moral values, but more immediately to pressure of laity opinion fostered by roseate promises of the profession, these paths do part where they touch the field of obstetrical analgesia.

Twilight sleep was given to the world, and by the world accepted, as a specific against the agony of child-bearing. The medical profession soon realized its shortcomings and its danger, but the public refused to yield the hostage promise. In no wise does this mean that the profession and the laity were in fundamental conflict, for the doctor has always sought to ease the pain of labor; but in an overzealous eagerness to redeem an overzealous promise, known and relatively efficacious methods of analgesia have been deserted for uncertain though presumably absolutely efficacious methods, and safety and life itself have often been sacrificed.

Ether had proved itself an excellent analgesic and anesthetic in the latter part of the second stage of labor and for the actual delivery. Chloroform extended the analgesia over a longer period of the second stage than did ether, and served quite as efficiently for the actual delivery.

Twilight sleep, aimed at the complete annihilation of all pain of the entire labor or the major portion of it, resulted in restless and often maniacal behavior of the patient, in the prolongation of labor, and in a greater incidence of operative deliveries. These factors, plus the direct depressing effect of the drug on the baby, resulted in a considerably increased rate in fetal mortality.

These facts becoming apparent to the medical profession, and the further fact that analgesia had been produced through the major portion of labor, led to laboratory and delivery room experiments with innumerable drugs.

The long list of drugs employed and the diver-

sity of opinion on the part of men of probity relative to the efficacy of all of the methods condemn any one analgesic as a panacea for the pains of labor. The modern literature lists ether, chloroform, morphine, nitrous oxide, ethylene, morphine and hyoscine, hyoscine alone, rectal ether-oil-quinine, sodium amytal, nembutal, nembutal and paraldehyde, pernocton, barbiturates and ether-oil per rectum, numal, avertin, spinal anesthesia, infiltration anesthesia, sacral anesthesia, paravertebral injection; and when we hear the conflicting reports on all of them, we truly feel that we have "heard great argument about it and about, but evermore come out by the same door wherein we went."

But fifty thousand obstetricians can't be wrong, and out of the hectic debate certain facts will not down. Negatively these may be chronicled thus—

Ether retards and stops the progress of labor.

Chloroform does the same to a lesser degree and is dangerous when long employed, or in toxic conditions of any degree.

Morphine slows or stops labor and is very dangerous to the child.

Morphine and hyoscine do the same, and also very often produce a restless or maniacal patient.

The literature emphasizes again the danger of narcotization of the child if morphine be given within three or four hours previous to birth. This holds, of course, for cesarean section as well as for delivery per vaginam. Through error in diagnosis, or through ignorance, morphine is often given the mother a few minutes before she delivers; often these babies show no hesitation in establishing respiration, and this fact alone has made many a man foolhardy about the use of morphine in labor. He forgets that these babies did not have time to assimilate a dosage large enough to narcotize them. Royston states, "Should a baby be born in less than thirty minutes or more than four hours following the injection of morphine, there is usually no effect on the baby."

Hyoscine alone, given early, may retard or

*Read before the Northern Minnesota Medical Association, Willmar, Minn., September 9, 1933.

stop labor, and often makes it necessary to restrain a restless patient.

Rectal ether-oil-quinine is often difficult to give. It may retard and even stop labor. It produces a restless patient, with, often, ineffectual expulsive efforts. The morphine which is recommended preliminary to the rectal instillation may retard labor or, in event of error in diagnosis and early delivery, may narcotize the baby; and, besides this, the attendant will be unable, for some time following the instillation, to do rectal examinations to note the progress of labor.

The barbiturates may retard or even stop labor. Intravenously they cause a definite drop in blood pressure. They produce a restless patient, often requiring restraint; they weaken the expulsive efforts of the second stage, thus necessitating an increase in operative interference; and they often produce a marked drowsiness in the baby.

Avertin is relatively toxic, its analgesic effect of short duration, and it must not be employed in patients with kidney or liver complications.

Spinal anesthesia has its own morbidity and mortality. It is difficult of application, short in analgesic duration, and so cannot generally be employed in the first and often not till late in the second stage. It retards labor and produces a fall in blood pressure.

Paravertebral injection is too untried to be recommended.

In keeping with the well-known disagreement among medical men, the virtues claimed by various writers for any one method of analgesia are categorically denied by others.

On the other hand, summarizing positively the results of these arguments, it may be said that, in general, *none of these methods and drugs has failed to give analgesia of varying degree and success*, and that *nitrous oxide heads the list as the most ideal analgesic and anesthetic in obstetrics*.

None can be said to be ideal. As Royston says, "All anesthetics add something to the danger to either mother or child." The ideal is high and, as yet, impossible of attainment. Roques, writing in the *Lancet*, defines it this way: "Under existing conditions it is necessary that the method of alleviating pain shall, most importantly, neither alter the normal mechanism of labor nor in any way increase the risk to the mother or child; it must minimize pain throughout labor as far as possible under existing conditions, and it must

not be unduly costly to the patient." Or, as another writer puts it, the drug must abolish all pain or memory of pain, there must be a wide margin of safety in dosage, no harmful effects on mother or child, and the progress of labor must not be delayed.

With one more quotation we may be able to bring out some fundamental factors not generally emphasized by the men reporting their successes and failures with various types of analgesic, hypnotic, or sedative drugs. Royston, with a judgment that is damning in its fairness to the patient, states, "The man who is unable or unwilling to give full time to his patient during labor should not attempt the use of pituitary preparations, nor anesthetics, nor analgesics, unless the patient is properly supervised during the entire time of their administration."

The literature on obstetrical analgesia may be divided into two groups: (1) enthusiastic advocacy of a single method or drug; (2) studiously conservative observations concerning the use of a drug or combination of drugs based invariably on studies of selected cases.

Selection of cases depends on a consideration of the mechanism of labor, the physical and temperamental resources of the patient, and the action, danger, and efficacy of analgesic drugs. Applying this knowledge with faithful adherence to Royston's dictum, just quoted, should enable the physician to avoid serious failures and to achieve a worthy degree of successful analgesia in a majority of cases.

The uterus, with its triple layer of muscle fibers crossing at various angles, is not only an organ built stubbornly to retain its contents but is also an organ of powerful expulsion. Labor is a conflict between the lower forces of retention and the upper force of expulsion. These forces are in partial conflict throughout pregnancy, but in the majority of cases the retention forces hold out till term, at the expense of muscle tissue, this being replaced to a large extent by connective and elastic tissue. At term, and sometimes earlier, the final battle is fought, the expulsive force working with a maximum of patience and a minimum of machine efficiency against the lower retention forces.

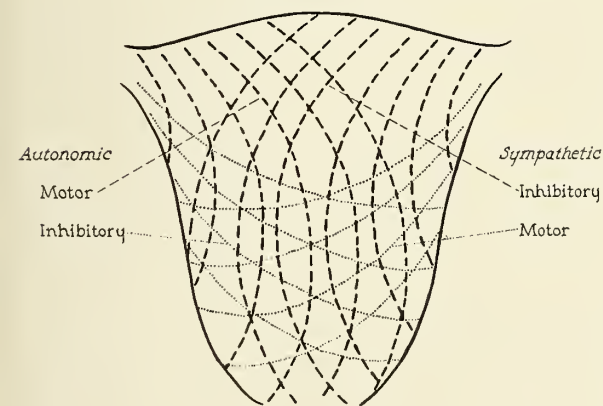
Added to this long drawn out tug-of-war we have the factor of failure of telegraphic communication of the nerve with the innervating centers, of conflict between these centers them-

selves, of disagreement between individual layers of muscles and groups of muscle-fibers in the contractile portion of the uterus; also the mysterious element of irritability and uncertainty of action of the uterus outraged by an occiput posterior position, and finally the triumphant tenacity of a cervix which has managed somehow to retain more than its share of muscle and thickness. In considering these factors one comes to realize that all labors cannot be, and are not, alike.

Complicated in design and uncertain in action as is the uterine musculature, its innervation or motivating power is even more complicated and uncertain. The anatomy and various functions of the motivating power are equally poorly understood by the best of neurologists and clinical observers alike.

Generally, it has been believed and taught that the sympathetic system is the motor drive to the uterine musculature. Why, then, does adrenalin, which is directly stimulating to the sympathetic system, relax a contracting uterus? Whitehouse and Featherstone, painstaking English researchers and clinicians as well, chart their findings relative to uterine innervation as follows:

CHART I. UTERINE INNERVATION



It consists of three systems: (1) local; (2) sympathetic; and (3) autonomic (parasympathetic). The local system is capable of producing rhythmic uterine contractions, and is independent of the other two systems, as in other involuntary muscle. The sympathetic stimuli are motivating to the circular muscle fibers and inhibitory to the longitudinal (expulsive) bundles. The autonomic stimuli are motivating to the longitudinal fibers, and inhibitory to the circular group. Both are controlled by higher centers in the medulla and

possibly the cortex, but are capable of acting independently of these.

In the face of our present knowledge of the complicated mechanism of the uterine musculature, and in the face of our abysmal ignorance relative to its innervation, we must inevitably come to the sober realization that it is not with impunity that we alter and interfere with these forces by drugs whose actions are, at best, uncertain. For, after all, our main objective as obstetricians is to present a living and healthy mother with a living and healthy child.

Our choice of an analgesic in any given case should be based on the type of labor presented. This necessitates not only a study of each patient, but also a study of each labor as early in its course as possible. In this connection we make two grave mistakes: (1) We speak of pains and contractions interchangeably, which results in confusion; (2) we base our treatment of labor too often on the subjective symptoms revealed by questioning the patient. The contraction produces pain, but these two do not present a constant relationship, hence the pain is not sufficient evidence of the efficacy of the contraction. Only by palpation can the length and intensity of the contraction be determined.

The pain comes on after the contraction has started, and lasts after the contraction apparently has disappeared. However, the pain comes to its peak much more quickly than the contraction, and is generally complained of for a considerable time after the contraction of the uterus has ceased.

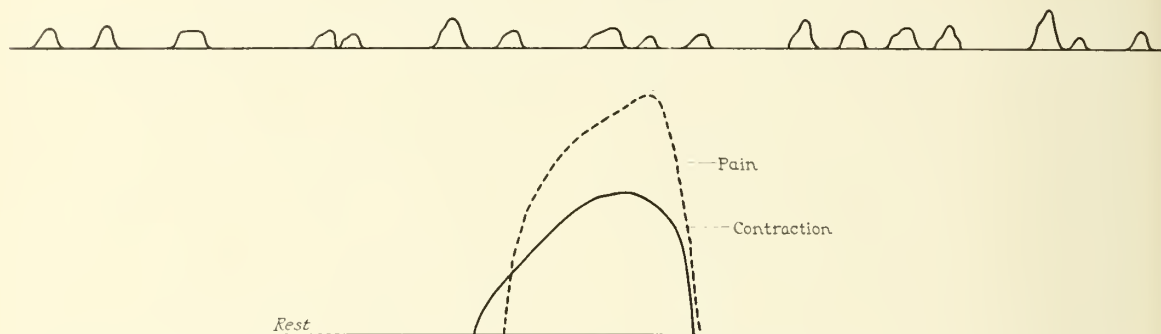
While weak uterine contractions are common throughout pregnancy, they are generally not painful. Those occurring in "false labor" are painful and are very frequently mistaken, by both patient and doctor, for true labor. They are marked by total irregularity; that is, the length, the intensity, and the interval are all most irregular, there is no progression, and pain is minimal.

Due to faulty nerve stimulation or to incoordination of the uterine musculature we may have a long period of agonizing pains with relatively poor and utterly ineffectual contractions; that is, the three layers of uterine muscle fibers are not coordinated in action, and small isolated groups of fibers are contracting independently. The uterus being originally a bilateral organ, this phenomenon is often beautifully exemplified in unilateral activity of the uterine musculature in

this type of labor. This is often referred to as primary inertia. Here there is irregularity of incidence rate, of intensity and length of contraction, and the pain is out of all proportion to the degree of contraction present.

gressively, nitrous oxide or ethylene are as ideal analgesics as can be employed at the present. Rectal ether-oil-quinine, with or without the preliminary morphine and magnesium sulphate, will produce a very satisfactory analgesia in a

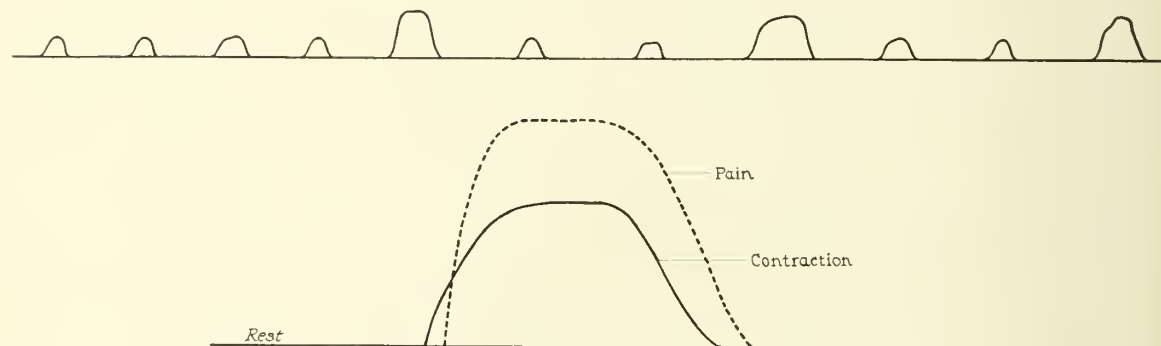
CHART II. INCOORDINATED LABOR—CONTRACTION AND PAIN



An occiput posterior position very often manifests itself to the close observer by the type of contractions present. These are characterized by quite regular incidence, very irregular intensity and length of contraction, and pain out of proportion to the degree of the contraction.

True labor progresses regularly. Duration and large proportion of cases. So will sodium amytal given orally, providing the dose is large enough. Nine grains are generally necessary and often twelve may be required. Rectal anesthesia which has not retarded labor, and which fails to give sufficient relief, may be successfully augmented by moderate dosage of sodium amytal,

CHART III. OCCIPUT POSTERIOR LABOR—CONTRACTION AND PAIN



intensity of contractions increase and the interval is progressively shortened.

More than 96 per cent of our patients fall into the class of uncomplicated vertex presentations. A close study of early labor will reveal either a normally progressing type of labor, the irregular type of muscular incoördination, or the excessively painful type which so often accompanies an occiput posterior position.

Assuming a fair acquaintanceship with a few better known non-toxic analgesics, and having observed the type of labor present, the application is often not difficult. In true labor where the contractions have gathered momentum pro-

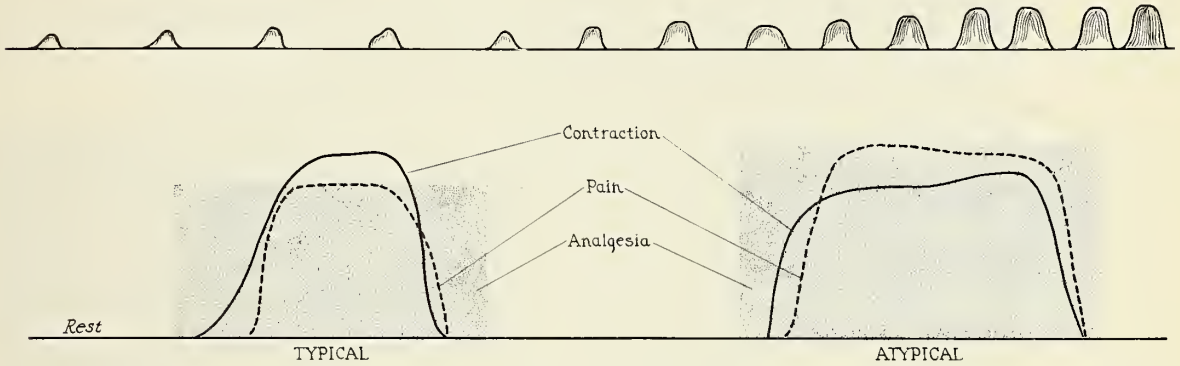
grains six to nine, orally. This combination of medication has proved quite successful. Nitrous oxide, ether, or chloroform is generally necessary for the actual delivery.

In the incoördinated type of labor the patient should be put to rest as soon as the type is surely diagnosed. By rest is meant rest from labor, that is, a complete relaxation of the entire uterine musculature. If uterine rest is decided on before the patient is fatigued, a hypodermic injection of one cubic centimeter of a one to one thousand solution of adrenalin may be sufficient. The uterus will frequently relax perfectly and the patient may rest for several hours. When labor

is resumed, it will very often be of the true progressive type, and lend itself, without further interruption, to the analgesics mentioned above. If the patient with incoördinate labor becomes very tired, however, and we wish her to recu-

Let us not forget that, in any case where the full power of uterine contractions must be conserved and utilized to the utmost, unhampered by the slightest retarding influence of an analgesic, postpartum rest and amnesia will often

CHART IV. TRUE LABOR—CONTRACTION AND PAIN AND RELATION TO ANALGESIA



perate as well, we may use a hypodermic injection of morphine sulphate (grain $\frac{1}{4}$) and atropin (grain 1.150) with thirty to forty grains of chloral hydrate in one to two ounces of water per rectum. Morphine with magnesium sulphate given hypodermically and ether oil per rectum also relax the muscles of the uterus and often lead into normal labor rate while the patient is still asleep. In the more stubborn cases, ether inhalation may have to be used to supplement these other procedures.

Where occiput posterior positions are accompanied by the irregularity of contraction intensity, stimulation with enemata or quinine should be attempted rather early, and if this does not lead into a regular progressive type of labor the patient should be put to sleep to conserve her own strength and that of her uterine musculature. On awakening she may go into normal labor. The method of securing rest may be any of those mentioned for incoördinate labor. In the occiput posterior positions we generally face a long-drawn-out labor and have to jockey, as it were, back and forth from complete rest to moderate stimulation, never forgetting that the best guarantee of a successful culmination of this irritating type of labor rests on conservation of the patient's energy throughout. Where nourishment by mouth seems inadequate, glucose by vein is not only a welcome substitute but also a splendid conservator and stimulant of uterine function.

more than counterbalance, in the patient's mind, the pain she has endured in an unmodified labor. In this connection sodium amytal is a most welcome adjunct. Six to nine grains of this drug given orally in the latter part of the second stage will not inhibit labor, but will allow the patient to sleep soundly for twelve to thirty-six hours after she has delivered, and permit her to awaken refreshed and often with but a very vague memory of her labor.

If this discussion seems too limited, remember that it is aimed at the uncomplicated vertex presentations which constitute more than 96 per cent of cases met routinely.

Very few authoritative reports in the literature are based on the use of the one-drug method. Most of them deal with the drug best suited to the stage of labor and to meet the individual situation and recommend employing several types of analgesia in the same labor, including ether, chloroform, or gas for the actual delivery.

Summary

Each labor is a clinical entity, and in order to produce safe obstetrical analgesia one must know the patient, study her labor, be familiar with more than one type of analgesic, administer and watch it himself or provide capable supervision, and finally, in the present status of analgesic drug therapy, one must not be dissatisfied with a relatively efficient analgesia and an absolutely healthy mother and child.

CASE REPORT

CYANOTIC CONGENITAL HEART DISEASE AND FULL TERM PREGNANCY

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and

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THE prognosis in congenital heart disease is usually considered very grave. This is especially true in those patients who have shown cyanosis from birth. Occasionally, however, patients with marked congenital defects of the heart live to sixty or seventy years of age. In following a considerable number of patients with various types of congenital heart disease over many years the presence of cyanosis itself has not seemed to be significant from the standpoint of prognosis. The clinical signs of cyanosis with the accompanying clubbing of the fingers and toes are so outstanding that the examiner is led to make an unfavorable prognosis on these signs alone. These patients who have had cyanosis from birth apparently adjust themselves to the lack of oxygenation of blood and except for dyspnea get along fully as well as those with congenital cardiac lesions without cyanosis. In a general way it may be stated that those patients with congenital heart disease who live beyond the age of puberty have a fair prognosis as to life regardless of the presence of cyanosis. A considerable percentage of children born with congenital heart disease die, of course, in the first few years of life, either because of the extensiveness of the lesion or because of an infection at the site of the congenital defect in the heart. The following case is one of an interesting congenital cardiac lesion, with cyanosis complicated by pregnancy and illustrates that in such cases the prognosis is not altogether poor.

Case Report

The patient, who was just under thirty years of age, was referred to one of us (Shapiro) for an opinion as to the advisability of permitting a pregnancy to continue. She was at that time about four months pregnant and very anxious to have her baby. The patient stated that she had known about her heart condition since she was six years of age. Before that time she had not been conscious of cyanosis or clubbing of her fingers but her mother had told her that she had always been more or less blue about the lips and eyes. She had been born at full term. No other member of the family had any congenital defects. She had become conscious of cyanosis and increasing clubbing of the fingers from the time she entered school. She had always been dyspneic but never to the extent that she was limited in any activities. She was able to keep up with the average child in athletics and as she grew older she played tennis and attended dances without difficulty. She graduated from high school and Normal school and taught school for a number of years before her marriage. The patient complained that all her life she had not been permitted to partake of ordinary activities which she felt perfectly able to do.

Doctors had always given a very gloomy prognosis and had ordered strict limitation in her activities. She had had pneumonia eight years ago and although she had been very ill finally recovered completely. On two or three occasions in the past she had had fainting spells and at present complained of some dizziness. Four years ago she had aborted spontaneously at four months.



Fig. 1.

Physical examination revealed a well developed, well nourished young woman, somewhat dyspneic, very alert and of unusually high mental ability. There was a high grade of cyanosis of all the mucous membranes, the face and conjunctivæ. The eyes were suffused and the vessels injected. Clubbing of the fingers and toes was extreme. The pupils reacted well. The eye-grounds revealed the typical engorgement of the veins usually found with high grade cyanosis. The head and neck were otherwise negative. The breasts were those of a pregnant woman. Examination of the lungs was negative.

No thrill was made out over the precordium. The heart was moderately enlarged to the right and left. A marked enlargement in the region of the conus pulmonus could be made out by percussion. The heart sounds were regular and of good quality, while in the third and fourth interspaces just to the left of the sternum a harsh prolonged systolic murmur could be heard. The murmur was transmitted across the base of the heart but was not well heard through to the back and could not be heard in the vessels of the neck. The second pulmonic sound was well heard; it was snappy and accentuated. On fluoroscopy the heart was globular in shape, probably slightly enlarged, the conus pulmonus was greatly enlarged and pulsated very forcibly. Blood pressure was: systolic 110, diastolic 70. A six foot x-ray film of the heart (Fig. 1) revealed the measurements as follows: T. T. 23 cm.; M. R. 4 cm.; M. L. 8.5 cm.; T. H. 12.5 cm. The electrocardiogram (Fig. 2) revealed a fairly marked right preponderance, but was otherwise within normal limits.

The abdomen with the exception of the enlarged pregnant uterus was negative. The extremities were

normal, no edema being noted. Examination of the urine was negative. The blood revealed a hemoglobin of 105 per cent with 6,800,000 red blood cells per cm.

A diagnosis of congenital heart disease, probably Tetrad of Fallot, was made and was based on a history of cyanosis, probably from birth, and the characteristic clinical, roentgenological and electrocardiographic findings in this type of lesion. The Tetrad of

The patient went into labor October 27, 1933, at which time laparotrachelotomy was done under spinal anesthesia of 150 milligrams of novocaine. Carbon dioxide and oxygen were given throughout the operation. The blood pressure at the beginning of the operation was systolic 116, diastolic 70 and the lowest during the operation was systolic 90, diastolic 60. The duration of the operation was thirty-five minutes. A



Fig. 2.

Fallot consists of congenital pulmonary stenosis, patency of the interventricular septum, enlargement of the right ventricle and an aorta riding over the opening in the interventricular septum and receiving blood from both ventricles.

It was concluded from the complete examination that the patient could with a fair degree of safety continue through a full term pregnancy. This opinion was based especially on the past history, the patient having been able to do almost a normal amount of physical work without unusual cardiac embarrassment, the fact that although the conus pulmonus was enlarged to a quite marked degree yet the heart itself was only slightly enlarged and also because there was no marked evidence of cardiac decompensation at four months pregnancy. We were well aware of the possible development of a subacute bacterial endocarditis superimposed on the congenital cardiac lesion, especially during the post-partum period, but because of the patient's good general condition and also because of her extreme desire of going through with the pregnancy, we advised that the pregnancy be not disturbed. It was agreed by both of us that the heart would sustain the least amount of strain if the delivery were accomplished by cesarean section. The patient was able to go through an unusually hot summer with no more than average difficulty and was not seen again by me until a few days before delivery. At that time the findings were essentially unchanged. The heart had, of course, been pushed up by the full term pregnant uterus, but there was no evidence of any cardiac embarrassment.

The patient was first seen by one of us (Simons) April 15, 1933. The last period had been February 1, 1933, and the date of expected confinement was November 8, 1933.

The initial pelvic examination revealed a pregnancy of about two and one-half months with a retroversion of second degree, which corrected itself spontaneously. Pelvic measurements were interspinal 26, intercrural 29, intertrochanteric 21, external conjugate 19.5, diagonal conjugate 10 plus, transverse outlet 9.5, and posterior sagittal 8.

The course of the pregnancy was normal in every respect except for slight dyspnea in the last six weeks. The fetal position was O. D. P.

baby girl in the O. D. P. position was delivered alive and weighed five pounds and ten and one-half ounces. The infant showed no fetal anomalies or deformities. The post-operative course was uneventful. The patient showed a temperature of 100.6° on one day. There was no postoperative nausea or vomiting. The wound healed by first intention.

On re-examination after delivery no change was noted in the heart, the patient had made an uneventful recovery and was able to leave the hospital on the fourteenth day after delivery.

Subsequent postpartum examination was negative. The uterine wound could be palpated vaginally and seemed to be uniformly healed.

The patient has since reported that she and her baby are very well and that she had apparently not suffered any ill effect from her pregnancy.

Discussion

Congenital heart disease even though accompanied by a high grade of cyanosis is not in itself an absolute contra-indication to pregnancy. Those patients with congenital defects of the heart who are fortunate enough to live to maturity are a select group, and must be considered in this light when the question of pregnancy presents itself. Unfortunately, in spite of the tremendous amount of research on the subject of cardiac function, no practical tests have as yet been developed to determine the cardiac reserve in a given case. In determining whether or not a patient with congenital heart disease should be permitted to go through pregnancy the most important factor is not the grade of cyanosis present. The size of the heart, the past history of evidences of cardiac decompensation, and the patient's ability to carry on the ordinary activities of life are far more important. With accurate cardiac diagnosis and modern obstetrical technic and careful cardiac supervision a rare patient with cyanotic congenital cardiac disease can safely go through normal pregnancy.

EDITORIAL

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BUSINESS MANAGER

J. R. BRUCE, Saint Paul

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Increase in Functional Disturbances

There is evidence that the economic debacle which began five years ago has brought more patients suffering from functional disturbances to the attention of physicians. Brooding over past losses, uncertainty over the future and the present struggle to keep one's head above water are sufficient to disturb one's equilibrium. Financial difficulties, as though not enough in themselves, seem too often to be followed by domestic and other difficulties.

The average individual is not a natural philosopher. While the ephemeral nature of worldly possessions has been emphasized during the past few years, it is questionable whether this has served to minimize their importance to the average American. The reaction of the individual is too often a resort to overuse of caffeine, nicotine, or alcohol, and a resulting loss of sleep. Functional disturbances may manifest themselves by an elevation of blood pressure and pulse rate, tremors or disorders of digestion. The individ-

ual knows he is not right and worry over his physical condition is added to the picture.

This type of patient offers a real opportunity to the physician for rendering a high type of medical service. A careful history and office examination generally reveals the trouble without necessary recourse to expensive procedures which only add to the cause for worry. Reassurance as to the absence of organic disease and advice as to the excessive use of stimulants with the prescribing of a mild sedative to assure rest is often all that is needed, and is of more practical value than an attempt to develop a philosophical attitude in the patient towards his troubles.

There is no question but that the average American has been living at too high a tension and that recent events have not relieved the tension. Although physicians as a group may not be good examples of how to live, this does not mean that they cannot give good advice.

Report on Nursing Schools

The nursing profession has been in desperate straits during the past lean years. Even previous to the depression there was evidence of a marked oversupply of trained nurses. The Committee on Grading of Nursing Schools of the American Nurses Association, after studying the problem for eight years, recently presented its report.

This report shows that the census in 1930 tabulated 288,737 women and 5,450 men nurses, or one woman trained nurse for every 424 of population. Since the year 1900, nurses had increased 2,374 per cent compared to a 62 per cent increase in population. No one knows how many practical nurses there are.

The reason for this phenomenal increase in the number of trained nurses seems to have been the result, largely, of the idea that a hospital with a nurses' training school is better than one without. This probably was true in the early years of this century when there was a dearth of trained nurses, and hospitals had to utilize untrained women for nursing. As the report

brings out, hospital nursing performed by graduate nurses obviously is of higher grade than that performed by student nurses. The present method of utilizing student nurses in large measure in supplying the needs of a hospital is the only instance of the kind in any profession. The same procedure would not be tolerated in the educational or medical field. The contention of the report is that this procedure is all wrong and should be terminated.

The recommendation of the Committee is that most of the training schools for nurses be closed. More than 50 per cent of the schools are at present maintained in connection with hospitals with not more than seventy-five patients. The International Council of Nurses has maintained that nursing schools should be limited to hospitals having a minimum of 100 patients.

The Committee recognizes the difficulties which will be encountered in attempting to have its recommendations carried out. These, however, may not be insurmountable. There has already been some indication that the employment of graduate nurses in hospitals to supplant student nurses need not add to operating expense. Graduate nurses are more efficient than students. Maids may be employed at small wages to do much that student nurses now are required to do.

In order to assure a better trained personnel in the future, to do justice to present graduates by providing hospital employment, and to limit the inroads of practical nurses into the field, the Committee feels that legislation may be required, not only for the licensing of training schools, but for the licensing of practical nurses.

The problem of the nursing profession is a large one. After all, the nursing profession has largely handled its problems unaided in the past and doubtless will be able to solve its present serious predicament.

VITAMIN C THERAPY

In the majority of cases, guinea-pigs maintained on a diet deficient in vitamin C will develop ulcerative lesions of the intestine, if fed daily doses of tuberculous sputum. If this deficiency diet is supplemented by an adequate amount of tomato juice (vitamin C), however, the animals almost invariably remain free from intestinal tuberculosis. Since the guinea-pig and man are apparently identical in their vitamin C requirements, McConkey and Smith of the New York State Hospital for Incipient Pulmonary Tuberculosis conclude that tomato juice therapy has a verifiable rationale in certain forms of clinical tuberculosis. (*Jour. A. M. A.*, November 25, 1933, p. 1731.)

Of General Interest

On September 11 the Scott-Carver County Medical Society met at Montgomery, Minnesota. Dr. W. A. Fansler spoke on the "Treatment of Hemorrhoids" and Dr. M. O. Henry spoke on the "Complications of Elbow Fractures."

On invitation of the New York Academy of Medicine, Dr. Charles N. Spratt will demonstrate his operations for glaucoma and cataract by means of motion pictures. He will read a paper on "The Closure of the Cataract Incision" at the Boston meeting of the College of Surgeons and a paper on "The Early Diagnosis of Glaucoma" at the Pennsylvania State Medical Society at Wilkes-Barre. Dr. Spratt left for the East Friday, September 28, and will be gone for about three weeks.

Dr. Frederick C. Warnshuis, for twenty-one years secretary of the Michigan State Medical Society and for the same period serving first as editor and business manager and later as business manager of the *Journal* of that society, has resigned to accept the position of Secretary-Treasurer and Director of Public Relations of the California State Medical Association. Dr. Warnshuis is nationally known to members of the profession as Speaker of the House of Delegates of the American Medical Association, a position he has held for fifteen years. The California profession is to be congratulated on obtaining a man of Dr. Warnshuis' experience and forcefulness to help direct their association activities.

ANTI-HORMONES

Thirteen years ago, active glandular extracts were few and most endocrine therapy was "polyglandular." Today, however, there are many pure or nearly pure extracts the effects of which are fairly well known and more or less controllable. It was thought that these preparations must surely at last provide effective means for the treatment of disease; and they have been extensively (even incautiously) employed for this purpose. Potent endocrine preparations are often administered to patients and frequently the desired effects may be attained; but, curiously, an individual here and there, who should promptly be cured by this extract or that, not only fails to improve but occasionally even becomes worse. The dose is increased without effect; the preparation is then condemned or the patient given up as hopelessly refractory. Now comes an answer to those who have been reckless enough to believe in the endocrine millennium. The organism does not so readily accept assaults on its glandular equilibrium, for, as Collip and his associates have just shown, there are "anti-hormones." Repeatedly, warnings against the indiscriminate application to therapeutics of our still fragmentary knowledge of glandular physiology have been issued by those who have provided the foundation for the present exceedingly active work in this subject. Only a year ago the Council on Pharmacy and Chemistry pointed out the possible danger of the unconsidered administration of such active agents in the field of gynecology. Recent investigations provide emphatic substantiation of this point of view. (*Jour. A. M. A.*, August 18, 1934, p. 492.)

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association

B. J. Branton, M. D.

W. F. Braasch, M. D., Chairman

J. C. Michael, M. D.

The Council Meets

"For the past year I have been 'on the spot' in the matter of administration of medical relief.

"Now, from the moment when your new Emergency and Advisory Contact Committees begin to function, it is you who are 'on the spot' instead."

So Mr. Benjamin E. Youngdahl, Director of the Social Service Division of the State Emergency Relief Administration, presented the changing relief situation to members of the Council in session in Saint Paul, Sunday, September 9. Medical relief is under Mr. Youngdahl's jurisdiction.

The meeting was called to discuss details of the organization of medical Emergency Advisory and Contact Committees of Three in every county in the state: to discuss details of medical allowances to be paid for this relief service: to discuss the entire problem informally with Mr. Youngdahl, himself, who generously devoted three hours of his time to the Council.

Of interest to the membership at large will be two agreements as to nomenclature and interpretations reached by the Council and Mr. Youngdahl.

Allowances: Not Fees

One: Funds paid to physicians under the terms of the Federal Bulletin No. 7 and the state bulletin "Medical Care in the Home" will not be called "fees."

Amounts agreed upon for the various services allowed under the regulations are not fees in any strict sense of the word since they do not represent adequate payment for the work done. They are simply allowances to assist the physician to pay the expenses involved in care for relief clients of the government which will be called, officially, medical allowances.

What Is A Hospital?

Two: The question, what is a hospital and what shall constitute hospital treatment, was set-

tled as follows for purposes of payment of allowances:

A hospital is an institution where beds are provided for keeping patients over night. Thus physicians who maintain several beds for the comfort of patients who are being treated in their offices are not to be construed as maintaining hospitals, and allowances will be paid for treatment given under such circumstances.

Following are some of the remarks made by Mr. Youngdahl to the Council, which are of great interest as representing an official résumé of the relief situation today:

Physicians Complimented

Physicians are to be complimented, for the most part, on the manner in which they have cooperated with the State Emergency Relief Administration in the operation of emergency medical relief.

In evaluating an experiment, as in a game, the hits are likely to be forgotten, the misses over-emphasized.

No Two Counties Alike

The relief situation differs in each county. All but one have organized for federal relief to supplement local funds:

Many northern counties cannot contribute a nickel to the care of their indigent.

Most of the southern counties are able to pay part of the bill, using federal funds to supplement.

Ramsey and St. Louis counties are paying for medical relief from local funds and the Emergency Relief regulations do not apply there. Minneapolis is doing the same thing though rural Hennepin County, is organized for federal medical relief, and is receiving federal funds for medical relief.

This is the present Relief Organization as schematically represented:

STATE SET-UP

GOVERNOR FLOYD B. OLSON, Administrator
L. C. ZIMMERMAN, Assistant Administrator

Social Service
Division for
"Human Relief"

Works
Relief

Finance

Rural
Rehabitation

Transient
Division

COUNTY SET-UP

County Relief Administrator

County relief worker

Engineer

Rural Rehabilitation
Manager

Accounting and
Disbursing
Officer

One of the above four county relief employees serves, also, as County Relief Administrator.

Cash Relief

More and more of the relief given is in cash. That is, clients are paid for their work in cash instead of in relief orders.

In a few counties medical relief has been on a cash basis also, with the occasional result that the client did not use the cash for medical service when that was designated.

A ruling is to be made soon which will make it necessary to issue orders for all medical service.

Procedure Soon To Be Effective

1. Doctor must sign an agreement stating that he is willing to care for patients under the terms of the federal and state regulations.
2. Ordinary cases will then be assigned by the Relief Worker to the doctor chosen by the relief client.
3. If a relief client has no choice of physician the Relief Worker will be instructed to ask him if he owes any physician a bill and to send the patient to that physician. Otherwise he will send the patient to the most convenient physician, having regard, also, to equitable distribution of the work.
4. The doctor will make an estimate of the service needed on a standard form which the Relief Office will then authorize in writing.
5. The doctor will perform the service and send his bill in accordance with allowances agreed upon by the Relief Office.
6. An order will then be written by the Relief Office for doctor and relief patient to sign.
7. Bill is then paid by the central office.

Emergency Cases

1. Upon receipt of a call, the doctor usually goes out and gives the necessary care, regardless of whether he knows the patient.
2. If the patient is a relief client the doctor should then make out a standard form and get authorization in writing from the Relief Office within twenty-four hours in the time of the call.

In these cases the doctor assumes a risk, of course. The service may or may not be authorized, depending upon the status of the client.

Eligibility To Relief

There is a difference between medical need and relief need.

It is the responsibility of the Relief Office to determine whether or not a given person should be on the relief rolls, no matter what his medical need.

People who have barely enough for food and shelter and nothing left over for medical care are eligible for medical relief.

People who have not exhausted their credit resources are not eligible for any relief.

Doctors living near county lines are eligible to attend patients in other counties and their bills, in that case, must go through the county Relief Office where the patient resides.

We feel, however, that the doctor should not travel too far in making country calls. As far as possible, he should take mileage costs into account.

No hard and fast rule should be set up that might damage the doctor-patient relationship.

Hospital Care

Federal funds cannot be spent for hospital care. In some counties, however, the Relief

Worker is authorized to pay for hospitalization out of local county funds.

One-Half Million On Relief

About 75,000 families are now on what is termed "human relief" in Minnesota. This number is in addition to those who are receiving relief for their animals.

Assuming an average of four persons to each family, it may be estimated roughly that one-half million people in Minnesota are getting some sort of federal relief today. And the number is increasing constantly.

Last month the number of families on human relief was only 73,000. At the end of September it will probably be 76,000.

By next March the number may reach 125,000, depending upon the expansion of private business and of the Public Works program.

Medical Economic Functions

Advisory and Contact Committees should be chosen to represent all of the licensed practitioners in the county.

I shall be glad to allow them, as an experiment, to assist in adjudicating bills for medical allowances wherever there is a dispute between the doctor and the Relief Office. The final authority as to dispute bills rests with the State Relief Office.

The committees will act as boards of appeal, and as advisory committees to coöperate with the relief administration.

In order to function as appeal boards these committees must all of them be duly elected, even those already appointed and functioning.

A few doctors have been guilty of solicitation of relief patients. This is a problem which should be handled by the Medical Association and Contact Committees. It is definitely against the spirit of the Medical Agreement.

Compensation For Relief Workers

By a recent regulation of the State Emergency Relief Administration, all relief clients and State Emergency Relief Administration employes working on any of the projects initiated and approved within the Emergency Relief Administration are now entitled to compensation and relief if they are injured on the job.

With this regulation a new Division of Safety

and Compensation has been set up in the State Emergency Relief Administration and a new fund, called the "Accident Compensation Fund" has been established.

Medical interest in the new division is self-evident.

Physicians and surgeons will be paid "*REASONABLE*" fees from this fund for care of injured workmen subject to approval by the Division of Safety and Compensation. The term and the capitals appear in the regulations as issued.

Hospital charges will be paid in accordance with a schedule of fees already adopted and published by the division.

Traumatic Injuries Only

Only traumatic injuries received in the course of work will be compensated under these regulations. Disabilities arising out of conditions or circumstances surrounding the place and nature of employment such as temperature, excessive heat, moisture, cold, humidity, et cetera, will not be compensated. Hernias, back strain and heart failure cases must be considered non-compensable, also, unless established by full and satisfactory evidence. It must be established, also, that the injury was not incurred willfully, as a result of intoxication on the part of the worker or as a result of gross negligence.

A sum of money equivalent to 1.5 per cent of the total SERA funds for labor on Emergency Relief Administration payrolls for the preceding month will be set aside to form the Accident Compensation Fund, also the same percentage of total salaries of the Emergency Relief Administrative personnel paid during the preceding month.

Regulations for payment of physicians from this fund are as follows: (Regulations Governing Compensation and Relief for State Emergency Relief Administration Workers and Employes, State of Minnesota.)

May Call Doctor Of His Choice

"Whenever a Minnesota Emergency Relief Administration employe, employed on a project within this state, is injured while in the performance of duty, he shall have the right to call or consult a duly licensed physician or surgeon of his, or her, choice for medical treatment. The expenses of this initial treatment and first aid shall be chargeable to the Accident Compensation

tion Funds, notwithstanding that the claimant worker may later be disallowed compensation or further medical expense on his claim; provided, however, that in all such cases the physician making such examination shall promptly submit to the Division of Safety and Compensation a true, full and complete report of the physical condition of the claimant worker in such manner as may be required by the said Director. Providing, further, that in no case shall medical expenses or disbursements become allowable for treatment of a purely mental condition or derangement on the part of the employee.

"The Accident Compensation Fund shall not be liable for or chargeable with further medical expenses in addition to original treatment and examination, unless and until the Director authorizes and awards compensation to said claimant; any further medical treatment attention rendered between initial treatment and authorization by the Director will be rendered by such physician or surgeon entirely at his peril and upon the responsibility of the worker."

Reviewing Relief

At the end of June, 1934, twenty-nine states were organized to give medical care to relief patients under FERA Bulletin No. 7 regulations.

Four states were unable to organize under the new plan for legal or financial reasons such as absence of state appropriations.

Six states had preferred not to organize at all.

Nine states had made some steps toward organization but had been unable to come to an agreement with the professional societies.

The above statements are from a comprehensive study of the medical relief situation made by Miriam Simons Leuck for the American Public Welfare Association and published in a pamphlet that should make interesting reading for every member of a medical association.

The six states who have preferred not to organize for this relief include four New England states, Connecticut, Maine, Massachusetts, and Vermont, where the local system of medical care for the indigent is practically uniform and appears to be satisfactory. Nevada felt that its county physicians could take care of its sparse population and was not inclined to change. Oklahoma was of the same mind but is now thought to be getting ready for organization. Iowa is clinging to the system developed between county medical societies and county authorities popularly called the "Iowa plan" and shows no sign as yet of changing.

Nine Reported Conflicts

The nine states said to be delayed by administrative-medical professional conflicts are listed as Alabama, Arizona, Arkansas, Indiana, Louisiana, Maryland, Nebraska, Oregon and Virginia.

"In most of these states," according to the welfare association study, "previously existing services were at a low level and efforts were early made to secure the benefits of a new set-up. In all of them, however, agreement between the administration and the organized medical profession has been difficult to obtain."

"The chief points of difficulty have been: one, the underlying theory of the plan; two, the level of the fee scale; three, provision of machinery to enforce the plan and allow for its alteration as new problems arise. Scattered local groups of medical and dental men in almost every part of the country have refused to cooperate with the relief administration on this theoretical basis. One group of physicians in Alabama urged the organization of a clinic with hired physicians to care for relief patients."

"Only one state medical society, that of Virginia, has expressed itself on the matter officially. In dentistry, the state dental societies of Florida, Connecticut, Nebraska and Rhode Island have adopted a similar policy."

Virginia Resolution

Following is the Virginia resolution dated October, 1933.

RESOLVED that the Public Relations Committee of the Medical Society of Virginia disapproves of the plan proposed by the State and Federal Emergency Relief organization for the compensation of physicians on a fee schedule basis for the care of the indigent sick, and be it also

RESOLVED, that we recommend to the various county medical societies that they cooperate with the local relief agencies in working out suitable plans for the medical and surgical care of these cases without charge for services rendered.

"In actuality, in most states where the majority of members of the medical profession adopted this attitude, the program was probably not greatly affected thereby as there were also states in which relief funds were so limited that little paid medical care would have been available in any case."

Transportation Charges Varied

A total of thirty-two fee schedules, some of which are now in force and some of which, while

not accepted by both parties, are being used as a basis for negotiations, were available for inspection.

The most striking feature evident in the comparison of these scales is that there is a relatively small range between minimum and maximum fees for house calls, whereas there is a wide range between charges allowed for transportation. Also, between minimum and maximum fees for the less standardized services such as surgery, fractures and instrumental and other abnormal deliveries.

Very little data were available from any of the states as to costs of the service or the number of patients benefited.

Administrator after administrator answered, "I know we should have statistics of this sort but we haven't been able to get them."

In one year's experience with the new program, the following problems and difficulties have shown themselves to be fundamental, according to the welfare association study. They are:

Problems

1. Financial: essential poverty in certain areas, unwillingness in many areas to devote funds for this purpose and lack of information in most areas regarding costs, combined with fear of a great increase in costs over care as previously furnished.

2. Facilities and trained personnel: insufficiency of facilities in certain localities, inability to use existing facilities to best advantage due to scattered or unbalanced distribution of the population and difficulty of securing qualified personnel and nonpolitical administration.

3. Need for medical advice and coördination from the Federal Emergency Relief Administration.

4. Development of effective local supervision of medical work and control of costs.

5. Collection of data and utilization of agencies for determining costs and scope of service.

6. Provision of hospitalization.

7. Utilization and adjustment of relations with clinics, et cetera.

8. Adjustment of relations with the medical profession.

9. Better correlation with public health services.

10. Provision for care for chronic illnesses.

11. Provision for special services.

The fact that very few states or cities have sufficient hospitals or funds to provide hospital care for those who need it but are unable to pay was obvious from replies to the questionnaire.

Gap Unfilled

The federal regulation against expenditure of federal funds for hospitalization, based upon the

supposition that existing facilities are adequate, has therefore been the source of much difficulty and many complaints.

It is obvious, says the report, that as long as this gap in the fundamental care of illness is left unfilled, proper care will not be provided.

The conclusion is, however, that, in spite of the mass of detailed criticism of the act and its functioning, the large majority of those who are concerned with its operation have found many concrete benefits secured through its operation. They regard these benefits as consisting chiefly in the substantial extension of service provided, the educational effects of the program in practice and the experience gained through its flexibility and experimentation.

Minnesota Committees Will Help

It should be noted that Minnesota is among the twenty-nine states now operating with reasonable success under federal regulations for medical relief.

The organization of Medical Emergency Advisory and Relief Committees in each county to advise and assist the local relief worker will go a long way toward solving these problems.

Medical Field Representative

George B. Larson of Saint Paul is field representative of the Minnesota State Medical Association for Emergency Medical Relief.

He was appointed to this newly created position by the House of Delegates at Duluth and he went to work under the direction of the Council and the Secretary, September 4, 1934.



GEORGE B. LARSON

Mr. Larson's job is specifically to assist in the smooth, equitable and efficient operation of emergency medical relief in Minnesota.

His qualifications for the work are unusual and warrant confidence in him and

reliance upon him by all members of constituent medical societies in the state.

He came to Saint Paul from Frederic, Wisconsin, where, for six years, he has been business manager for a medical group and executive secretary for the Polk County Medical Society.

As business manager of the clinic he has had ample experience with the fixing and collection of fees in a rural community.

As medical society secretary he has reinforced that experience with a working familiarity with all of the problems of medical organization in a rural country. This county, incidentally, is similar in most aspects to the countryside of Minnesota.

As Polk county secretary, Mr. Larson introduced a number of organization activities generally attempted only by large city societies and with conspicuous success.

A large part of his work during the last few years has been concerned, inevitably, with arrangements for care of the indigent in his county. Largely as a result of his efforts, the Iowa plan for contract care of the indigent was successfully organized in Polk County before the institution of federal relief on a large scale. Subsequently Mr. Larson organized his county under the Wisconsin plan for emergency medical relief and participated in its smooth and successful operation.

The Minnesota plan for Advisory and Contact Committees of three physicians from each county, whose sole function will be to work with local relief workers in the administration of local medical relief, has much in common with the Wisconsin plan. Mr. Larson's experience with this type of organization will undoubtedly prove of value in his work in Minnesota.

Malpractice Suits In Minnesota

Recently members of the Council sent out questionnaires on malpractice to all members in their districts.

Following is a tabulation of replies from the first three districts to return their questionnaires.

District Two: Dr. L. L. Sogge, Windom, counselor.

Nine members had malpractice suits brought against them in the last ten years: fifty-nine had not.

Four suits were settled in court.

Four were settled out of court.

Nine have been threatened with a suit which was abandoned.

Forty-eight carry malpractice insurance; twenty do not.

District Three: Dr. H. M. Workman, Tracy, counselor.

Fourteen members have had malpractice suits brought against them in the last ten years; seventy-nine have not.

One had a suit brought against him which is not yet settled.

Seven had suits brought that were settled out of court.

Five had suits brought that were settled in court.

Two had suits brought that were dropped.

One had a suit that was settled in the doctor's favor.

Fifteen have been threatened with a suit that was abandoned; seventy-five have not.

Sixty-seven carry malpractice insurance; twenty-three do not.

District Six: Dr. J. M. Hayes, Minneapolis, counselor.

Fifty-three have had malpractice suits brought against them; 265 have not.

Two have a suit started which is not yet settled.

Twenty-three had a suit settled out of court.

Two had a suit settled in the defendant's favor.

Seventeen had suits that were settled in court.

Five had suits that were dropped.

Two had suits that were thrown out of court.

Preventive Measures

Following are all the suggestions looking toward prevention of malpractice suits for all three districts. They are nearly the same for each.

1. X-ray all injuries.
2. Follow up all cases started.
3. Advise lockjaw serum in all injuries, even a scratch.
4. Don't attempt too much—call a consultation if it seems in the least advisable.
5. Follow standard treatment.
6. Inform the patient of all possibilities.
7. Carry a good protection policy.
8. More ethical practice among doctors.
9. Stop criticizing other doctors.
10. Less jealousy among doctors.
11. Every M.D. should belong to his medical society.
12. Unity in the medical profession.
13. Closer social relations with honorable attorneys.
14. Educate the doctor to do better work by post-graduate course in the different societies.
15. Do your best in every case and be careful.
16. Doctors talk too much.
17. More care.

18. No distinction between competent and incompetent physicians.
19. Publish names of physicians who testify against fellow physicians.
20. Expel doctors who testify against other doctors.

Serious Problem

When all replies are returned and tabulated the Council will make a joint study of the situation in coöperation with Dr. B. J. Branton, who is making a supplementary survey for the Medical Economics Committee.

The problem of malpractice litigation is a serious one and demands the best thought of organized medicine to meet it effectively.

If malpractice suits increase, it is only a question of a short time, according to underwriters, until no more malpractice insurance will be written. In the meantime premiums are mounting to a point where they are beyond the ability of many medical men to pay them.

Reply to your malpractice questionnaires.

Public Health Education

In its 1933-1934 report to the House of Delegates the Committee on Public Health Education made several important recommendations.

One urged the organization in every county and district medical society of an actively functioning Public Education or Public Relations Committee.

How many counties have such a committee?

What specifically can such a committee do?

The local public health committee is vitally needed in every community, state committee says, to represent medical opinion in every community public health program and to give it proper assistance; to assume proper leadership everywhere in health education among children and adults; to keep a watchful eye upon unsanitary conditions and disease prevention in every community.

Interesting The Family Doctor

Another important recommendation asserts that we need to enlist an active interest in our public health program on the part of the family doctor; to show him how to avail himself of services and materials provided by state committees; to encourage and keep in proper hands a state-wide program of preventive medicine and public health.

The further development of the Speakers' Bureau and Speakers' Library is also urged so that an active and well informed corps of med-

ical speakers shall be available at small expense to address lay groups in all parts of the state.

Health Talks

Incidentally the committee reports the impressive total of 867 health talks arranged through state headquarters for the last year. These talks were given before federated clubs, parent teachers' associations, public health nurses, Kiwanis Clubs, commercial club meetings, and schools.

Obviously, says the committee, there is a real demand for medical speakers and it is very important to the success of our work that more physicians who are willing and able to give lay talks be enlisted.

The committee also recommended that the Orthopedic Clinics carried on throughout the state under the joint auspices of the Orthopedic Club, the State Department of Rehabilitation and Re-education and the Christmas Seal organization have medical society interest and co-operation.

It is the experience of the clinicians, provided through the Orthopedic Club, that few children brought to these clinics have been without adequate advice and treatment from their own physicians. They need, chiefly, the assistance of state agencies to help fit them for schools and jobs.

Seen By The Secretary

Being the Log of the Month of a Busy Medical Executive

August 13: Mankato. At the meeting of the Southern Minnesota Medical Society. The society is to be congratulated on its program. Four shows were going on at once, all interesting and most of them round-table discussions, built on the same plan as the Duluth meeting.

Unquestionably, the small group meeting is the most effective and popular foundation for post-graduate education whether in the form of society meetings or post-graduate courses.

August 14-23: North to Bemidji, Baudette, Roseau, Fergus Falls, Crookston, Thief River Falls . . . a 1,400 mile trip.

Doctors are feeling good in this part of the country. Crops are good enough and the tourist crop is excellent.

Made many calls to help along the organization of our Emergency Advisory and Contact Committees. Great interest was expressed by everybody, but no lists of committees came in.

Here is an interesting sidelight on mileage costs and Federal Emergency Medical Relief allowances in these northern counties; especially

in view of the fact that the Relief Administration has felt that mileage allowances are too high.

Some of the men have not even made expenses on long trips to take care of Federal Relief clients. That was when they were obliged to engage transportation such as snow-mobiles to get over bad roads in bad weather.

With Munns

August 27: Spent the day with a young lawyer, Clarence Munns (not the former Minnesota football player), from Kansas. Munns has been engaged as executive secretary by the Kansas State Medical Association.

He came to Saint Paul as the final stop on a long tour to study medical society organizations. Detroit, Cleveland, Indianapolis, Milwaukee, Madison, were other ports of call.

August 29-September 4: North again. Conferred with President-elect Coventry of Duluth on appointment of 1935 committees. This job of committee appointments becomes more important and more exacting each year. Nowadays, committee chairmen and even committee members are not figure heads. They work!

Minneapolis Meeting

September 4: Lunched with Dr. Henry B. Ward of Washington, D. C., and the Deans of the University of Minnesota to discuss the possibility of holding our next state meeting in Minneapolis during the week of June 24 when the American Association for the Advancement of Science meets at the University. Dr. Ward is permanent secretary of the Association.

There are many advantages to be considered in this arrangement.

We shall have the benefit of several world famous speakers to be brought to Minneapolis by the other organization. They can be engaged to speak at our sessions.

We shall also be able to extend the privileges of registration mutually so that all who attend will be welcome at both meetings.

Dr. Ward himself is interested in the plan. His organization will make a special point of medical science at this session in the interest of the joint arrangement. It is probable that he will take advantage of the opportunity of securing some of Minnesota's famous medical men as speakers for his sections.

Hotel accommodations are ample in Minneapolis for a large attendance at both meetings.

Incidentally, the Minneapolis meeting may set a new precedent in our state meeting programs. It may be the first of a series of great Twin City biennial meetings to be staged, the Council has decided, on a larger scale than ever attempted before.

The next one would then be in Saint Paul in 1937. Intervening meetings would be held at other medical centers in the state.

Larson And His Work

September 4: George Larson reported for work to state headquarters this morning. He will spend a week getting acquainted with our office routine in Saint Paul, making up his schedule, and getting acquainted with the State Relief Administration officials.

Next week he will begin his task of helping along the efficient operation of medical relief in Minnesota.

The first job, naturally, will be the organization of Emergency Advisory and Contact committees in each county.

Mr. Larson is well equipped by his Polk County, Wisconsin, experience for this work. He was selected after due consideration by the Council and the House of Delegates. Members may trust him.

September 5: 4-H Club examinations at 11 West Summit. These examinations have been conducted annually for four years by three co-operating organizations: the 4-H Clubs, the Minnesota Public Health Association, and the Minnesota State Medical Association. They take a whole day of everybody's time at state headquarters. Twelve medical specialists, a dentist, three nurses and twenty-five clerks examined the 114 contestants, rated them and picked the winners between 9 a. m. and 5 p. m. Busy day!

Same Mistakes

September 7: Lunched with Benjamin E. Youngdahl, Director of the Social Service Division of the State Relief Administration, and George Larson, our field representative for relief.

Talked over problems in medical relief operation which should be taken up with the council at its Sunday, September 9, meeting.

We were forced to acknowledge, as the result of this conversation, that medical men make some of the same mistakes as other organizations who deal with the State.

Some of these mistakes have raised serious problems up at the Capitol. They come to light and make difficulties especially when individuals with political influence undertake to interview the "higher-ups."

It is apparent that the State Relief Administration wishes to refer as many of the local problems as possible back to the counties for local solution.

That is one reason why the administration so warmly encourages organization of our Medical Emergency Advisory and Contact Committees.

September 9: All day with the Council. This meeting was long and crowded and left many problems still to be settled. A résumé of Mr. Youngdahl's talk in the afternoon is printed elsewhere in this section. A meeting of the Emergency Executive Committee will be necessary soon to complete action on many matters connected with the medical relief. The secretary is not the only officer of your society who is working hard these days on the relief problem.

The Council took enough time from consideration of relief problems to approve plans for the Minneapolis meeting. It will be held June 24 to 27 at the time of the American Association for the Advancement of Science meeting.

New Award

September 10: North again to Brainerd for the fine two-day program of the Northern Minnesota Medical Association.

This association appointed a committee to study and take action on an award to be presented by the society for some part of the state meeting program each year.

It would be fine if some other society would do the same thing before arrangements have been completed for our next annual meeting. The precedent is already well established.

It began with the gold medal awarded each year for the best scientific exhibit presented by an individual medical researcher by the Southern Minnesota Medical Society.

The Minnesota Radiological Society followed last year with the establishment of the Russell D. Carman Memorial Lectureship, which will provide a radiological lecturer annually for the state meeting. Dr. Alexander B. Moore, of Georgetown University, Washington, D. C., gave the first lecture last year.

In addition, it has been customary for some

time for the host society in the city where the meeting is held to provide one speaker.

If each large county society and even a few interested individuals would endow further lectureships our state meeting would rapidly assume the importance of the Inter-State meeting in this section of the country. It is already the outstanding state meeting of the Northwest.

The success and scope of our state meetings is witnessed by the enthusiasm of our commercial exhibitors. Already, several have contracted for space in Minneapolis. Many have written congratulatory letters. One or two even sent in their money for next year's space within a month after the July meeting in Duluth. Such interest is unprecedented among exhibitors who must ordinarily be wooed patiently for many long months before a meeting.

Detoured on my way home to call on Dr. Herman Johnson at Dawson; Dr. H. M. Workman at Tracy—organization is well underway in his district; Dr. L. L. Sogge of Windom, Dr. Holbrook at Mankato, and Dr. Strathern at St. Peter.

Discussed the relief situation, and especially the allowance schedules, with all of them except Dr. Holbrook, who was not in.

New Problem

September 14: Gave a six-minute radio talk on our 4-H Club examinations on the Farm and Home program over WLB at 1:15 p. m.

September 17: Lunch with Mr. Youngdahl. Mr. Youngdahl will meet with the Council again next Sunday, September 22. He is very anxious to settle the amounts of medical allowances for Emergency Medical Relief, so that they will meet the approval of the doctors and also fit into his "human relief" budget satisfactorily. One simple allowance schedule for the entire state is what he needs and all of us hope that Sunday's meeting will see all of these matters settled.

Reported opinions I heard on my Brainerd trip, and found Mr. Youngdahl very ready to compromise on several items in deference to these opinions.

Afternoon: Conferred twice with Mr. A. V. Rohweder, Director of the Safety and Compensation Division of the State Emergency Relief Administration. This is a new division and a new service.

It means that employes on relief projects un-

der the sponsorship of the State Emergency Relief Administration and other cooperating units will be compensated for traumatic injuries received in the course of their work.

Hospital bills will be paid in private hospitals in accordance with a schedule already worked out and issued by Mr. Rohweder's division. Doctors' bills will be paid also, if they are deemed reasonable by the division. Here is a new and important phase of the relief problem.

Evening: Went to Cambridge with Dr. George Earl of Saint Paul, Councilor of the Fifth District, to attend a meeting of the East Central Minnesota Medical Society. It was a committee organization meeting.

Seven county meetings were arranged on the spot for the purpose of electing Emergency Advisory and Contact Committees in each of the counties involved.

September 18: Two more county election meetings arranged by telephone this morning. Thus, nine counties in Councilor District Five should be ready shortly for the new relief program. We're getting action!

Noon: Conference with Mr. W. C. Walsh of the Minneapolis Civic and Commerce Association about 1935 meeting in Minneapolis.

Mr. Walsh is very much interested in our meeting, very courteous, but he hesitates at the expense. It will cost considerable to stage our meeting at the Minneapolis Auditorium.

There is plenty of space at the Auditorium. It will house all of our group meetings and exhibits nicely.

If we can agree upon terms, the Minneapolis meeting bids fair to be the biggest ever staged by the state society in Minnesota.

If not—well, we can always go back to the smaller meetings.

Evening: Off to Chicago to attend the Secretary's Conference of the American Medical Association. Back for the Council meeting Sunday.

Minnesota State Board Of Medical Examiners

Minneapolis Man Pleads Guilty To Posing As A Physician

State of Minnesota vs. James A. Enright

James A. Enright, twenty-four years of age, residing at 1514 Tenth Avenue South, Minneapolis, entered a plea of guilty on August 30, 1934, before the Honorable E. F. Waite, Judge of the District Court, to a charge of practicing healing without a Basic Science Certificate. The specific charge against Enright was that he was holding himself out to the public as being engaged in the practice of medicine and surgery. Judge Waite, after hearing the facts, imposed a sentence of thirty days in the Minneapolis Workhouse and the defendant was placed on probation for a period of one year.

For several weeks the State Board of Medical Examiners has been checking the activities of this defendant. Enright first represented himself as being a doctor and having graduated from the University of California. On investigation this was found to be untrue. Enright has no medical education whatsoever, but at the time of the May truck drivers' strike in Minneapolis he volunteered his services in treating and caring for injured and sick truck drivers. For this he was paid the sum of \$50.00. When the strike was again called in July Enright acted in the same capacity and was paid approximately the sum of \$100.00. He was placed under arrest by the military authorities on August 1, and placed in the stockade at the State Fair Grounds. He was released on August 4, and upon the completion of the investigation by the Medical Board on August 23, a warrant was issued for his arrest. Enright was warned by Judge Waite to refrain from practicing healing in the future unless he had the necessary qualifications.

The State Board of Medical Examiners wishes to express its appreciation for the splendid cooperation shown in the handling of this case by Mr. Ed. J. Goff, County Attorney of Hennepin County, and Mrs. L. A. Selover, Assistant County Attorney.

President's Letter

Some Phases Of Our Responsibility

Doctors can no longer carry on private practice untouched by the threat of public interference. So many organizations exist, national and state-wide in their scope, which are concerned with the preservation or control of public health, that many medical men rightly feel it is their duty to help formulate the policies of these organizations. The committee on the cost of medical care, financed by the Foundations, presented the opinions largely of a group of laymen, on what they considered to be the best method of bringing medical care to the public.

I think it is the opinion of most medical men in Minnesota that this program, if carried out, would revolutionize and disrupt the practice of medicine.

With the best intentions in the world, laymen can hardly interpret the ethics and ideals of the profession or uphold the high standards attained by generations of self-sacrificing physicians. We believe that matters pertaining to public health should always be defined and regulated by medical advice. It is of the utmost importance, therefore, to the public as well as to the profession, that medical men should have a voice in determining policies for all boards which are concerned with the health and well-being of the public, such as charity clinics, welfare boards, school boards, public health associations, and clubs with philanthropic activities. The Woman's Auxiliary has a like responsibility and should have a voice in determining policies of women's clubs that have an interest in public health matters.

Nor should our interest in public affairs stop at this point. It is not enough that Minnesota stands as a leader among the states for her achievements in medical legislation. That stand must be maintained in every legislative year. Those interested in adverse legislation are like a prize fighter looking for an opening. To better illustrate this thought, I quote below extracts from a circular letter recently sent out by the

chairman of the Legislative Committee of the Illinois State Medical Society:

"Physicians are in a peculiarly strategic position to exercise an important and usually a determining influence in the character and trend of legislation, particularly on matters relating to medicine. As a political force, the organized medical profession does not claim great power and could not very well be otherwise. As individuals the physicians can and should be powerful factors in those political matters which influence the practice of medicine from the standpoint of patient, public, and doctor.

"We are on the eve of an election.

"In order to exercise his right of franchise intelligently and to perform his duty to himself and community every physician in Illinois should make it a point to meet and get acquainted with every candidate for the state and national legislatures. He should communicate to these candidates his opinions concerning medical matters that are apt to be up for legislative consideration. A ten minute chat with a candidate prior to election and under favorable circumstances is worth more in moulding his attitude on legislative matters than a dozen delegations of lobbyists after the General Assembly convenes.

"Physicians are intimately acquainted with many people. This gives to them a particularly advantageous approach to political leaders. By using this advantage the physician can obtain a sympathetic hearing that will have a powerful influence over the crystallization of thought in the minds of legislators.

"Your Legislative Committee wishes to urge upon you the duty and responsibility that is yours in respect to political matters. That you make contact with candidates and express your opinions on medical problems is of the greatest importance.

"Moulding legislative thought by contact with candidates is an opportunity, a privilege, and a duty of every physician. In this way he can do important constructive service in building the governmental structure on a sane, firm foundation. Criticizing politicians and bewailing government activity after new laws have been enacted is the poorest way known to correct undesirable trends, much less to prevent evil legislation."



President, Minnesota State
Medical Association.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

Medical Broadcast for the Month

The Minnesota State Medical Association Morning Health Program

The Minnesota State Medical Association broadcasts weekly at 11:00 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of October will be as follows:

- October 3—Heart Tonics.
- October 10—Pneumothorax Treatment.
- October 17—Acute Appendicitis.
- October 24—Beriberi.
- October 31—The Biopsy in Cancer Diagnosis.

Inter State Post Graduate Assembly

The first International Assembly of the Inter State Post Graduate Medical Association of North America to be held east of the Alleghenies is to take place in the public auditorium of Philadelphia, Pennsylvania, November 5, 6, 7, 8 and 9, 1934, with pre-Assembly clinics on November 3, and post-Assembly clinics on November 10 in the Philadelphia hospitals.

The public auditorium is located in the University area and across the street from the Philadelphia General Hospital, thus assuring the Assembly close access to an abundance of clinical material.

The aim of the program committee, with Dr. George W. Crile as chairman, is to provide for the medical profession of North America an intensive postgraduate course covering the various branches of medical science. The program has been carefully arranged to meet the demands of the general practitioner, as well as the specialist. Extreme care has been given in the selection of the contributors and the subjects of their contributions.

The Philadelphia County Medical Society will be host to the Assembly and has arranged an excellent list of committees that will function throughout the Assembly. A most hearty invitation is extended to all members of the profession who are in good standing in their State or Provincial Societies, to be present and enjoy the hospitality of Philadelphia, "The City of Brotherly Love."

Minnesota Society of Internal Medicine

The seventeenth semi-annual meeting of the Minnesota Society of Internal Medicine will be held at Duluth, Minnesota, Saturday, October 20, 1934. The scientific program will be conducted at St. Mary's Hospital beginning at 9 A. M. Dinner will be served at six o'clock at the Kitchi Gammi Club to be followed by the annual business meeting and later by an address on Medical Experiences in India by Dr. Anderson Hilding of Duluth.

The meeting has been called by Dr. E. T. F. Richards, president, and the program has been arranged by Dr. F. J. Hirschboeck.

Northern Minnesota Medical Association

The annual meeting of the Northern Minnesota Medical Association held at Brainerd, Sept. 10-11, was well attended and a fine program rendered.

Dean Scammon's address on "Panel Medicine" in England and Dr. A. E. Jenks' lecture on "Minnesota Man," found two years ago on Highway No. 73, near Pelican Rapids, were the outstanding features of the program.

New officers elected are: Dr. G. I. Badeaux, Brainerd, president; Dr. A. N. Collins, Duluth, vice president; Dr. O. O. Larsen, Detroit Lakes, secretary-treasurer.

The Association will meet in Duluth next year.

O. O. LARSEN, *Secretary-Treasurer.*

Radiological Society of North America

The Radiological Society of North America will hold its next annual meeting at the Hotel Peabody, Memphis, Tennessee, December 3 to 7, 1934. The medical profession is cordially invited to attend. Further information may be obtained by addressing the Secretary-Treasurer, Dr. Donald S. Childs, 607 Medical Arts Building, Syracuse, New York.

Washington County

The regular monthly meeting of the Washington County Medical Society was held at the Grand Cafe in Stillwater, Tuesday, September 11, at 6:30 p. m.

The principal event on the program was a discussion of the state meeting at Duluth.

A bound volume of the *Northwestern Medical and Surgical Journal*, dated July, 1870, which was recently discovered, together with three or four other early bound volumes of the journal, was presented to the society by Dr. V. C. Thompson of Marine. It was decided to consult the Historical Committee as to the advisability of presenting the volume to the Historical Society.

A POLIOMYELITIS VACCINE

A vaccine that seems to possess the likelihood of efficacy in the diagnosis and treatment of poliomyelitis is at present undergoing development in the Laboratories of the Department of Health of the City of New York. Influenced by the earlier work and also by the favorable results recently obtained with antigens inactivated by germicides in the prevention of other virus diseases, investigators have attempted to develop a new antigen against poliomyelitis. Using extraordinary precautions, the group in charge of these investigations decided to test out the antigenic properties on themselves before attempting inoculation of children with the antigen. Several members of the research group were injected with a vaccine prepared by adding formaldehyde to a suspension of material from the infected spinal cord. It is proposed, after testing the blood of those who have been inoculated to determine the extent of the immunity developed, to carry the investigations further, inoculating children against this disease. The vaccine will, of course, have been established as absolutely harmless by the injection into the members of the committee and also as to its efficacy by the studies that have been made on monkeys inoculated with virus following inoculation with the vaccine. (Jour. A. M. A., July 28, 1934, p. 264.)

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

Books Received for Review

CONCEPTION PERIOD OF WOMEN. Dr. Hyusaku Ogino, Head of Gynecological Section of Takeyama Hospital, Niigata, Japan. 94 pages. Price, leatherette binding, \$1.00. Harrisburg, Pa.: Medical Arts Publishing Company, 1934.

DISEASES OF THE EYE. Chas. H. May, M.D. 14th edition. 496 pages. Price \$4.00. Baltimore: Wm Wood and Co., 1934.

This popular manual, planned for the student and general practitioner, has gone through fourteen editions since it first appeared in 1900, and has been translated into seven foreign languages. The present edition has been brought up to date, and is the same size as its predecessors.

Its clear, concise style, and the numerous colored illustrations are its chief characteristics. The discussions of the common eye conditions are complete, while rare diseases are passed over briefly. The author has been wise and careful in his omission of unnecessary detail.

The frequent use of this text in the library of the Hennepin County Medical Society attests its value.

CHARLES WILBUR RUCKER, M.D.

I KNOW JUST THE THING FOR THAT. J. F. Montague, M.D., Medical Director, New York Intestinal Sanitarium. 265 pages. Price \$2.00. New York: The John Day Co., 1934.

"For Patients without Doctors and Doctors without Patience," is the subtitle. Self medication always carries with it a certain element of danger, and this book could be criticized from that point of view, although the remedies recommended are not potent ones and could cause little harm. There is much of value to the lay person relative to the anatomy and physiology of the intestinal tube.

There is a semihumorous vein throughout which makes the volume readable and mildly interesting for the physician. The chapter on the "Crime Wave in Cathartics" is of distinct value, condemning the use of phenolphthalein and bran.

The laity will derive much valuable information from this volume, as well as good advice. From this point of view, it is of value. The approach of the volume is entirely to the patient.

J. K. ANDERSON, M.D.

A TEXT-BOOK OF PATHOLOGY. Edited by E. T. Bell, M.D., Professor of Pathology in the University of Minnesota, Minneapolis, Minnesota. Second Edition, enlarged and thoroughly revised. Illustrated with 364 engravings and 2 colored plates. Price \$8.50. Lea & Febiger, Philadelphia, 1934.

This new edition contains 140 more pages of text and forty-eight more illustrations than did the first, published four years ago. Much of the original text has been amplified and discussed in greater detail, the bib-

liographies are larger and have been made more useful by the addition of short explanatory notes giving the substance of the articles quoted, and more space has been given to the consideration of pathological physiology. A chapter devoted to the diseases of the bones and joints has been added.

The book was written with the object of providing the medical student with a text-book which he could use throughout his medical course and guide him into the clinical branches without any break in the continuity from the basic work. This has been done with such signal success that the book will be found very useful by medical practitioners in their daily practice. It might profitably be read from cover to cover by anyone who is interested in scientific medicine and it would be no difficult task to do this, for the book is written tersely and clearly throughout, and very adequately illustrated.

The bulk of it is from the pen of Dr. Bell himself, but the chapters on the mycoses and on the diseases of the liver and gall bladder by Dr. J. S. McCartney, on diseases of the heart by Dr. B. J. Clawson, on diseases of the spleen by Dr. C. J. Watson and on the diseases of the blood by Dr. Hal Downey all fit well into the picture and give a well-rounded volume of practical, up-to-date reference on a most important subject.

GILBERT COTTAM.

URINE AND URINALYSIS. Louis Gershenfeld, Ph.M., B.Sc., P.D. 272 pp. Illus. Price, \$2.75. Philadelphia, Lea & Febiger, 1933.

This is an excellent volume on urinalysis, particularly useful for general practitioners. The style is pleasing and the text is void of unnecessary theory and quotations. It describes the most modern methods of laboratory technic and contains chapters on secretion of the kidney, chemical examination for organic and inorganic substance and abnormal constituents. The subject of renal function tests and hormone tests for pregnancy are adequately covered. The author stresses the great value of microscopic examination of the urine when carefully conducted. There are numerous illustrations.

M. M. SARNECKI, M.D.

HIPPURAN

The Council on Pharmacy and Chemistry reports that Hippuran is a product of the Mallinckrodt Chemical Works, proposed by Swick for intravenous and for oral urography. Its chemical constitution is stated to be sodium ortho-iodo-hippurate. Sodium ortho-iodo-hippurate contains 38.8 per cent of iodine; it is said to be soluble in less than its own weight of water and to be stable in aqueous solution. It was chosen as a promising agent for visualizing the urinary tract, in view of the fact that hippuric acid normally occurs in the urine following the ingestion of benzoic acid, representing a conjugation of benzoic acid with glycine. Usually from 10 to 15 Gm. has been administered by vein in 40 per cent aqueous solution over a period of five minutes. No reactions have been noted except a sensation of generalized warmth, such as has been reported with other products used for intravenous pyelography. With a dose of 30 Gm., occasional vomiting has occurred. By the oral route, diagnostic pictures are reported to have been obtained 90 and 135 minutes after administration, in seven of fourteen cases. As the product has not yet been sufficiently widely employed adequately to determine its value, the Council has voted to defer further consideration of Hippuran until more evidence has accumulated with respect to its clinical usefulness, at which time the product will be examined by the A. M. A. Chemical Laboratory. (*Jour. A. M. A.*, December 16, 1933, p. 1968.)

MINNESOTA MEDICINE

Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine and Minneapolis Surgical Society.

Volume XVII

NOVEMBER, 1934

Number 11

THE RUSSELL D. CARMAN LECTURESHIP*

EDWARD S. SCHONS, M.D.

President of the Minnesota Radiological Society

Saint Paul

IT IS my great privilege to announce that there has been established by the Minnesota Radiological Society a permanent lectureship in honor of Minnesota's most highly distinguished roentgenologist, the late Dr. Russell D. Carman.

No name among the pioneers in various branches of roentgenology stands out with greater renown than does that of Dr. Carman. He was famous throughout the medical world, and especially famous throughout the roentgenological world. His contributions, especially in the x-ray diagnosis of diseases of the gastrointestinal tract, coming as they did during the early years of the development of this field, were among those which built up this subject.

It is therefore very fitting that a permanent memorial should be erected to him.

The Minnesota Radiological Society has had on its program from time to time in the past, perhaps about once a year, a distinguished roentgenologist from outside the state, and it had been the general plan to continue this procedure.

One of our three annual meetings for the past several years, as well as those of other special

societies, has been held at the time and place of the Minnesota State Medical Association's meeting. Our program has formed part of the state medical program. It was the brilliant conception of our genial and efficient secretary, Dr. Leo Rigler, that here was an opportunity for Minnesota's radiologists to create a suitable memorial to a distinguished pioneer and fellow worker and, at the same time, contribute an annual event, in the form of a lecture of outstanding merit on some radiological subject, to the program of the state meeting for the benefit not only of the radiologists but of all the members. The idea met with instant favor on the part of all concerned and was promptly approved and adopted, and it has been formally accepted by the Council of the State Medical Association.

The lecturer each year is to be chosen by the Minnesota Radiological Society and his expenses defrayed by that organization. This being the first lecture, it was thought proper that it should be inaugurated by an address on the life of Carman by one of his intimate associates who knew him best.

We are very fortunate and greatly honored in having a distinguished surgeon of the Mayo Clinic consent to perform this very pleasant task. I take great pleasure in introducing Dr. Donald Balfour.

*Introductory remarks preceding the presentation of the first address under the Russell D. Carman lectureship, by Dr. A. B. Moore, professor of roentgenology, Georgetown University, Washington, D. C.

The Life of Russell D. Carman

DONALD C. BALFOUR, M.D.

Rochester, Minnesota

Roentgenology having developed within the memory of the present generation, its true relationship to the control of chronic diseases which afflict the human race cannot easily be appraised; but it is a safe prediction that any present evaluation of this relationship, in retrospect, will be found to be an underestimation. Roentgenology not only has enabled the clinician to confirm his observations, but, more important, has given him information which is obtainable in no other way. It has made the impossible possible.

This diagnostic method is now more essential in the diagnosis of a greater number and wider variety of chronic diseases than is any other, and its application is steadily becoming more comprehensive. Since the whole structure of therapeutics rests on accuracy of diagnosis, the importance of this fact cannot be exaggerated. The future medical historian, in judging great benefactions to the health and happiness of mankind, must accord to roentgenology a place with anesthesia and antisepsis.

Many of the most serious diseases, notably carcinoma, frequently fail to give rise to any clinical signs or symptoms in their early stages, but roentgenology often makes recognition possible at a time when there is the most favorable opportunity for bringing about cure. The presence of early pulmonary tuberculosis, of symptomless carcinoma of the stomach, or of certain lesions of the skeletal system, in many instances can be determined only by roentgenologic examination, and if there were some means of applying it routinely, for example, in the course of periodic health examinations, countless deaths from these diseases could be prevented. The progress of roentgenology, therefore, will depend on its further development in detecting disease before clinical signs and symptoms are manifest, and a great impetus to this would be inexpensive, efficient, and practical roentgenologic methods that would result in early recognition of any deviations from normal, thereby contributing so much to longer and healthier life.

This tremendous capacity for good must not conceal the fact that it is on the interpretation of the revelations of the roentgenogram and

fluoroscope that depends the sound development of the science. The more keen the roentgenologist, the more he will realize that the significance of his findings must be judged by an astute clinician; just as the clinician will also demand skilled roentgenologic interpretation of his findings.

The debt to those who have developed this phase of science cannot be measured, and the Minnesota Radiological Society has added to its prestige by the establishment of an annual lecture in honor of Russell D. Carman, who will always be identified with that group of investigators who recognized the possibilities of roentgenology and who, by their industry, vision, and imagination, have carried it to such great heights. Carman possessed the true character of the pioneer. He was a prodigious worker, enthusiastic yet cautious; he was courageous in the face of difficulties and disappointments, determined to know the truth, and willing to sacrifice everything which might interfere with this purpose. He made it a practice to observe at the operating table that which he had studied by fluoroscope and roentgenogram. I shall never forget the eagerness with which he viewed the field of operation to learn whether his opinion could or could not be confirmed. I never knew him, when he had made a positive statement in an obscure case, to try to persuade himself that a lesion was present when it could not be seen by others; in fact, it often appeared that he seemed gratified if his diagnosis was not substantiated, for he realized that with any method which held such great potentialities for accuracy, its true value would be more quickly determined through encountering mistakes in diagnosis.

Russell Daniel Carman was born at Iroquois, Ontario, March 18, 1875. After preliminary study in Minneapolis Academy, he took the first two years of the medical course in the University of Minnesota. Moving then to St. Louis, he continued his studies in the Marion-Sims College of Medicine, receiving the degree of M.D. in 1901. For a year he did graduate work at Johns Hopkins Medical School, and then returned to St. Louis to practice. It was his first intention to take up orthopedics, but having a natural aptitude for the electrical arts, he was soon attracted to medical roentgenology, which was then in its early stages of development. Advancing with the science, and working diligently

and enthusiastically, he shortly became known as an exceedingly proficient and unusually reliable roentgenologist. He was made professor of roentgenology in the medical school of St. Louis University, but resigned later to accept the same post in Washington University. On invitation, he joined the staff of The Mayo Clinic January 1, 1913, as head of the Section on Roentgenology, and continued in that capacity until his death in 1926.

Carman's great contributions were in the field of gastro-intestinal diagnosis, and they are recorded in his classic monograph. He was quick, however, to sense the limitations of roentgenology, and when the medical world became aware of the extraordinary accuracy of roentgenologic diagnosis of lesions of the gastro-intestinal tract, he was one of the first to point out that in certain cases it was possible to determine only that a lesion was present, and that any attempt to specify its pathologic character might mislead the clinician and be responsible for unsound advice being given the patient.

On the occasion of Carman's untimely death, his life-long friend and associate, Albert Miller, wrote: "The world of the x-ray lost a master workman. For a time it will grieve that he is dead. For a longer time it will rejoice that he lived."

I feel greatly honored that I should have the privilege of inaugurating the Carman Lectureship, and I wish to congratulate the Society on the creation of a lectureship which, in paying tribute to Russell D. Carman, will bring to all subsequent meetings of the Association the spirit of one who loved his profession and who exemplified its highest ideals.

Introduction of the Lecturer

B. R. KIRKLIN, M.D.

Rochester, Minnesota

I am indeed very happy for the opportunity of presenting my old friend and associate and chief, Dr. Moore. The excellence of his work in roentgenology makes him a most appropriate man to have the honor of introducing the first Carman Memorial Lectureship to this Association.

Dr. Moore is so well known throughout this state, as well as throughout the continent, that his history is probably familiar to most of you, but to the few who may not know I will say that Dr. Moore received his medical degree at the University of Virginia in 1907. He practiced medicine near his birthplace in that state until 1910, when he was called to the Mayo Clinic as a consultant in the Section on Roentgenology.

Dr. Moore was associated with Dr. Carman for thirteen years. Following Dr. Carman's death in 1926, he was made head of the same Section of Roentgenology. He held this position until 1930 when, on invitation, he accepted the chair of radiology at Georgetown University, Washington, D. C., and also the position of chief radiologist at the Emergency Hospital in that city.

Like Dr. Carman, Dr. Moore's chief interest in radiology has been in gastro-intestinal diagnosis, and in that field his ability is almost uncanny.

He has chosen for his subject today, "The Function of the Roentgenologist in the Diagnosis of Intra-Abdominal Conditions." Mr. Chairman, ladies and gentlemen, I present to you Dr. Alexander B. Moore.

THE FUNCTION OF THE ROENTGENOLOGIST IN THE DIAGNOSIS OF ABDOMINAL DISEASE*

ALEXANDER B. MOORE, M.D.

Professor of Roentgenology, Georgetown University
Washington, D. C.

IN accepting the invitation to deliver the first Carman Memorial Lecture, I am not unmindful either of the honor or the responsibility that it brings to me. I thoroughly appreciate this privilege, but especially am I grateful for the opportunity to acknowledge the obligation that we owe to the man whom we honor today. Both as an individual and as the spokesman for roentgenology I come to pay tribute to the memory of Russell Daniel Carman. I was Carman's first pupil; for many years I was his associate; for a time I occupied the position made vacant by his untimely death; even now I remain his student, striving to apply those principles which he laid down.

Russell Carman came to the Mayo Clinic in 1913 accompanied by Albert Miller. No happier combination of spirits could have been found, for learning without enthusiasm is seed cast on barren soil; knowledge without wisdom is perilous. He came armed with certain facts the true value of which he sought to know; his opportunity was great, for he found in his new surroundings a wealth of material with unlimited facilities for determining the accuracy of his work. Roentgenology owes much to Carman; Carman owed much to those great men who gave to him the opportunity for proving the worth of the signs that others had described. In no line of diagnostic endeavor is a general knowledge of surgery, pathology and clinical medicine so essential as in roentgenology. My preceptor was ideally equipped for his chosen career; for he was first a practitioner of general medicine, and, after a postgraduate course in one of the country's leading institutions, was associated with a prominent Western surgeon. He then began his work in roentgenology, not as a pioneer but rather as one who sought practical usage for a great physical agent. In Carman's work and in

that of his disciples we find less of originality but more of practical application. His ability to separate the grain from the chaff, to utilize the important and to disregard the unimportant, was striking.

In this lecture it is my intent to emphasize the fundamental principles of our art, to trace briefly the great developments in modern roentgenology, to describe the methods now available, and to appraise their possibilities.

In stating that the roentgenologist should be considered as a consultant, I ask of you no undue regard, I claim for him no exalted position. Rather do I demand of him that he so equip himself that he fulfill that function. He must be schooled in experience, trained to observe and to correlate, and thoroughly imbued with that degree of humility so necessary for success in any line of endeavor. As one whose opinion may not be final but must be correlated with the findings of others, he must accurately appraise the data so obtained. There must be a sufficiency of confidence and above all not too much of skepticism in the work of his confreres. The assumption of error on the part of others is, to my mind, the deepest pitfall in diagnosis. The roentgenologist must search for the unusual but never disregard the obvious in so doing. He should draw his conclusions primarily from his own diagnostic criteria, yet in the final analysis he must utilize all available evidence. In the absence of conclusive data he must not disregard the suggestive. If this appraisal seems idealistic, it also emphasizes Carman's influence. Need I remind you that without certain ideals there would be no men; without certain men there would be no ideals.

Has science given to the roentgenologist of today the equipment necessary for him to occupy his place in abdominal diagnosis? Has roentgenology kept pace with other medical progress? Let us consider some of the changes that have come within the past two decades.

*The first Carman Memorial Lecture, instituted by the Minnesota Radiological Society. Delivered before the annual meeting of the Minnesota State Medical Association, Duluth, July 17, 1934.

In 1913, when I first knew Carman, equipment for the generation of x-rays was imperfect; the vacuum tubes were unstable and limited in capacity; the lack of high speed photographic emulsions and the imperfection of intensifying materials made speedy radiographic work an impossibility. There was much discussion as to the dangers of fluoroscopy, and its use was limited to a few workers. Rieder's opaque meal, first used for experimental study and later applied clinically, had given certain diagnostic facts. It was conceded that cancer of the stomach by its intrusion on the lumen gave a picture suggestive, at times typical. Gastric ulcer by the excavation of the necrotic area produced a niche visible to the roentgenologist; the spastic or cicatricial resultant of such an ulcer might produce an hour-glass deformity.

Lewis Gregory Cole had made his great contribution in which he described deformity of the duodenal cap as characteristic of duodenal ulcer. This had been greeted with the skepticism so frequently the lot of a pioneer and lacked the support of surgical and clinical confirmation. Pyloric stenosis was demonstrable, its cause assumptive. Obstructive lesions of the large bowel were recognized; gross encroachments on the lumen were, at times, demonstrable; little or no attempt at the diagnosis of inflammatory lesions was made. The literature was filled with data on stasis and ptosis; constipation was as definite a roentgenologic as a clinical entity. Appendicitis was diagnosed by a chain of contradictory roentgenologic signs; the appendix filled with opaque material, it did not fill; it was segmented, it was not segmented; and, most important of all, either an intact abdominal wall or a carefully taken history proved that the organ had not previously been removed.

Through all this period we find little or no attempt at a determination of the cellular nature of a lesion, its extent or etiology. The diagnosis of gallbladder disease was limited to a few cases in which the shadows of stones could be demonstrated and to that debatable group in which a shadow suggesting a thick-walled gallbladder was visualized. Roentgenologic visualization of the liver and spleen were unheard of. Little or no attention was paid to the outline of the shadows cast by the psoas muscles; the contour and movements of the diaphragm were not regarded as being of any particular significance. The

roentgenologic examination of the urinary tract consisted chiefly in the search for calculi and in the use of retrograde pyelography, the opportunity for the use of which was limited chiefly to those workers associated with large medical institutions. The limitations of roentgenology were definite and clearly circumscribed.

The great advances in roentgenology are due to several factors, chief of which are: improvements in mechanical equipment, the utilization of chemical compounds that permit the visualization of certain viscera, and the increased appreciation by roentgenologists of shadow values and their correct interpretation in terms of physiology and pathology. Modern generating equipment is now available, the output of which is practically unlimited; Coolidge, by his invention of the vacuum tube which bears his name, has made the utilization of these high voltage currents possible. The improvement in the radio-sensitive photographic emulsions and the use of the Potter-Bucky diaphragm have made it possible to obtain radiographs of a quality undreamed in the past. Graham, Cole and their collaborators have, by their epoch-making work, made the visualization of the gallbladder a simple procedure. By the introduction of thorium salts into the blood stream the liver and the spleen become opaque to the x-rays and reveal their structures to the eye of the roentgenologist. Intravenous urography has made the roentgenologic study of the urinary tract simple and practical, since by the introduction into the blood stream of certain iodine-bearing salts that are eliminated by the kidneys, accurate visualization of these organs is obtained. Trained roentgenologists have availed themselves of the opportunities afforded by these great contributions; they have carefully applied them in their clinical work and have accurately appraised their diagnostic values.

Equipped as he now is, the roentgenologist approaches the problems of abdominal diagnosis with no little confidence; he utilizes whatever measures are necessary to arrive at his goal. As the initial step in his examination he will obtain stereoscopic roentgenograms of the abdomen and study them with care; he will search for urinary calculi, so often the simulant of digestive disease; he will note the size and position of the renal shadows. If indicated, he will resort to intravenous urography in order to obtain definite knowledge of the condition of the kidneys. The

course of the psoas muscles will be carefully traced, since distortion or obliteration of their outline is highly indicative of post-peritoneal tumors or accumulations of fluid. He will search for localized accumulations of gas in the intestinal tract, for their presence may point to an obstructive lesion. The contour and excursion of the diaphragm are closely studied and search made for the protrusion of an abdominal viscus into the thoracic cavity. In examining the gastrointestinal tract he will satisfactorily distend and carefully approximate the visceral walls; distortions and displacements will be noted, and by fluoroscopic palpation a strict search will be made for extra-luminal lesions. In fine, his examination will constitute an abdominal exploration.

Let us now consider the value of the data obtained by such a roentgenologic examination. Instead of the former stereotyped diagnosis of gastric cancer, the roentgenologist of today is able to demonstrate with considerable accuracy the extent of the process and to speak with authority as to the possibility of radical removal of the lesion. Without hesitation he distinguishes between malignant and benign polypoid growths; he recognizes gastric lues and, with almost microscopic accuracy, differentiates it from the infiltrative, linitis plastica type of malignancy. Certain ulcerating lesions, long regarded as primarily inflammatory, are now definitely classified roentgenologically as degenerating carcinomata. This diagnosis is based on Carman's "meniscus sign" which he described in 1921, and, to my mind, represented his greatest contribution to our art. By its proper application and recognition many patients are spared those dietetic deprivations so necessary to the healing of peptic ulcer and come at once to surgery, their one hope of permanent cure. In the consideration of gastric malignancy the experienced roentgenologist has learned to be guarded as to prognosis and in prophecy as to life expectancy; his statistics prove to him that certain patients, although untreated, may live for months, even years. He realizes that this inexplicable delay in the inevitable does not militate against the accuracy of his diagnosis.

In the search for gastric ulcer the roentgenologist now gives heed to slight departures from the normal that in the past were disregarded. He knows that slight spastic deformities, especially those involving the pyloric antrum, may be the most valuable indices of a lesion located

elsewhere in the stomach. Also he realizes that certain extra-gastric lesions may reflexly cause such spastic encroachments; he is aware of the disturbances due to emotional factors. In evaluating indirect signs all factors capable of producing them are considered. By proper palpation the roentgenologist is able to visualize the crater of an ulcer so small that its discovery by the exploring hand of the surgeon may be difficult. In the diagnosis of peptic ulcer, as in other branches of medical art, the fallacy of attempting to account for the degree of complaint by the extent of the disease is apparent. Frequently symptoms of long duration are due to a lesion so minute as to almost escape detection.

The recognition of duodenal ulcer has become a most precise procedure; no longer does the roentgenologist depend on gross peripheral deformities of the bulb or upon conclusions based on gastric retention and peristaltic abnormalities. Slight spastic encroachments in contour are discovered and properly differentiated from anatomic anomalies. Small mural craters are delineated, and that definite entity, duodenitis, is recognized. Kirklin's work in establishing the roentgenologic diagnosis of duodenitis represents one of the greatest of the recent contributions to abdominal diagnosis.

In no branch have greater strides been made than in the examination of the large bowel. The use of air distention in conjunction with the opaque enema has greatly facilitated this procedure. Now, in experienced hands, small, non-obstructive growths are discovered and their nature determined with precision. Distinction between the benign and the malignant is extremely accurate. Diverticula are easily demonstrated and infection in them, by its spastic manifestations, gives rise to a typical picture.

Changes due to inflammatory disease in the intestinal wall produce roentgenologic signs that are accurately diagnostic both as to etiology and to extent. The diagnosis of chronic ulcerative colitis, amebic and tuberculous infections has been made astoundingly correct. It affords me no little satisfaction to note that the once popular diagnosis of spastic colitis is passing rapidly to well-merited oblivion.

The examination of the vermiform appendix has become a valuable adjunct to our art. In approximately 80 per cent its lumen can be filled with opaque material; its position can be estab-

lished and disease demonstrated with considerable accuracy. Local tenderness, fixation and cecal spasm are important factors in the diagnosis of appendicitis; the absence of these signs is likewise important in preserving the integrity of the abdominal wall and preventing the surgical, or rather let us say the operative, treatment of the ever-popular condition, chronic appendicitis.

In the early days of our work there was no more perplexing problem than the examination of a patient previously subjected to some surgical procedure involving a change in the anatomic relations of the abdominal viscera. However, the modern roentgenologist has so familiarized himself with surgical procedures that he now is able to interpret the aftermath of such changes and detect disease conditions and abnormal states which may occur. It was by a correlation of the surgical and roentgenologic findings that Balfour and Carman gave us the data on which the diagnosis of gastrojejunal, or stomal, ulcer is made by the roentgenologist. This was a great achievement and has been far-reaching in its results. Errors in surgical work may later be revealed by the roentgenologic examination. At times the roentgenologist may demonstrate with incontrovertible proof that some enthusiastic wielder of the scalpel has mistaken the terminal ileum for its distant relative, the jejunum, and established an anastomosis between it and the stomach. This further substantiates the observation of a great surgeon, a member of this Society, that the greatest danger in gastroenterostomy lay in the ease with which it is performed.

An appraisal of the value of roentgenology in abdominal diagnosis would be incomplete without due consideration of cholecystography. Since the original work of Graham great advances have been made; many of them have come from the work-shop in which Carman formerly labored. The technic of its application is now simple; its diagnostic findings are extremely accurate. In experienced hands cholecystography

ranks high in the diagnosis of gallbladder disease; by its use the varying degrees of cholecystitis are recognized, encroachment on the visceral lumen by small papillomatous growths is demonstrated and non-radiopaque gallstones are readily discovered. Dependent as it is upon the elimination of iodine into the bile, the roentgenologist considers all factors capable of disturbing this process; he appraises his shadow densities in terms both of physiology and pathology. He is conscious of the import of systemic as well as local disease.

While its use has been relatively limited and wide experience in its diagnostic value is lacking, hepatosplenography offers great possibilities. As previously indicated, following the intravenous injection of a solution of thorium dioxide, the liver and the spleen are made visible in the roentgenograms. The size and contour of these organs are accurately delineated; malignant processes, both primary and secondary, and areas of necrosis may be detected. Especially striking has been the demonstration of the presence of metastatic carcinoma in the liver. With increased knowledge concerning its value and experience in its application it seems probable that this diagnostic agent will be more and more frequently utilized and its employment may give data obtainable by no other means.

This general summary of its present potentialities indicates incontrovertibly that roentgenology has accomplished much; its developments have contributed greatly in making the abdominal wall transparent to the diagnostic eye. Upon the individual rests the responsibility for a proper application of his armamentarium. If by careful observation and conservatism he practices his art, if he strives unceasingly and unselfishly to contribute his best to the alleviation of human suffering, he will, like that great roentgenologist whose memory is honored today, become a true consultant. Russell Carman, *Ave atque Salve!*

CARDIAC IRREGULARITIES*

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FOLLOWING the epochal papers of Mackenzie upon the classification of arrhythmias, and the introduction of the electrocardiograph, the importance of rhythmic disturbance was so much overemphasized that other types of heart failure were ignored. Such was the viewpoint upon heart disease until a little more than a decade ago. It was not until about ten years after Herrick's classical paper upon the clinical manifestations of coronary occlusion that the importance of coronary sclerosis began to be realized. Since then most of the literature upon heart disease has dealt with this subject.

Medical historians of the future will doubtless record the four outstanding events in cardiology as: Withering's introduction of digitalis, Mackenzie's clinical studies of the disturbances in cardiac rhythm, Lewis' elaboration of electrocardiography, and Herrick's description of coronary occlusion. Withering pointed out how the function of the myocardium may be modified by digitalis. Mackenzie showed that rhythmic disturbances are manifestations of abnormal myocardial function. The work of both these investigators reminds us that in understanding the action of disturbed myocardial function, except in the anginal syndrome, some knowledge of the physiological properties of the heart muscle is essential. These properties, emphasized more or less by all physiologists, are irritability, conductivity, tonicity, rhythmicity, and contractility.

The object of this paper is merely an attempt to indicate to the general practitioner how the clinical importance of most of the heart irregularities may be recognized without graphic aid. Only those types of rhythmic disturbance due to hyperirritability of the heart will be considered. This does not include the arrhythmias in heart block the result of depression of conductivity, or *pulsus alternans*, a sign of exhaustion of the property of contractility. The sinus arrhythmias, about the only type of heart irregularity found in childhood, will not be included since this type

of arrhythmia is the result of irregular impulses formed in the sinus node and cannot be interpreted as evidence of, or the cause of, disturbed function of the heart muscle. The most common types of cardiac irregularity are extrasystoles, paroxysmal tachycardia, auricular flutter, and auricular fibrillation.

Extrasystoles

Extrasystolic arrhythmia, the usual cause of an intermittent pulse, is the most common type of irregularity found after childhood. It usually can be readily identified without graphic aid by the relatively slow pulse and an occasional or frequent premature beat followed by a long compensatory pause. Extrasystoles are most likely to occur during relaxation following exercise or at night immediately after retiring. This type of irregularity tends to disappear upon exercise, due to the increased heart rate. When occurring with a rate above 100, the diagnosis of an innocent extrasystole should be made with caution. Although occurring frequently, many patients are unaware of their existence; in others, the complaints vary from palpitation, fluttering, thumping or flopping in the region of the heart, to precordial distress that interferes with sleep. The viewpoint of certain writers that an extrasystole after every normal beat is of less diagnostic importance than when occurring infrequently, is an observation I have been unable to verify. Whether the ectopic beats in extrasystoles originate in the ventricle, auricle, or junctional tissue, can be determined only with an electrocardiogram, but this is only occasionally a matter of importance.

Viewed as an early sign of heightened irritability of the heart muscle, many causal factors, both extracardiac and cardiac, should be considered. A careful history will often yield more information than a cardiac examination. An apparently innocent extrasystole may be the clue to the unraveling of a difficult diagnostic problem, whether the result of some toxic agent,

*Read before the annual meeting of the Minnesota State Medical Association, Duluth, July 18, 1934.

disease of some other organ, a chronic infection or an incipient cardio-vascular disease.

The disappearance of extrasystoles following the removal of chronic infection is a common observation, and their occurrence during acute infections may be the first signal of cardiac damage. An occasional extrasystole during pneumonia may be nature's method of warning the physician that the heart is suffering from the toxins of the disease and the increased irritability should not be accentuated by the use of digitalis.

A commonly overlooked cause of extrasystoles is a slight increase in the secretion of the thyroid gland. Clinical observation and experimental investigations show that in goiter the thyroxin becomes fixed in the cells, thus increasing the metabolism of the heart muscle, and the first clinical evidence of this is not infrequently an extrasystole. The relative infrequency of extrasystoles found in severe hyperthyroid patients in hospitals and clinics can best be explained by the tachycardia which is associated with the high grade hyperthyroidism. In many instances I have observed extrasystoles due to disease of the thyroid gland, long before there was any demonstrable increase in metabolism or other clinical sign of the hyperthyroid state. Moreover, I have occasionally seen extrasystoles develop without tachycardia, following the administration of small doses of desiccated thyroid. As an illustration: two sisters, aged fourteen and sixteen, respectively, with apparently normal hearts, were given 2 grains of desiccated thyroid daily for obesity. At the end of two weeks each had frequent extrasystoles, and in one they occurred after every normal beat. The heart rate in one was 74, and in the other 68.

In valvular lesions and in hypertensive hearts, extrasystoles are not uncommon, which suggests physiological dilatation of the heart as a cause of the hyperirritable muscle.

An example of extrasystoles as an early sign of coronary sclerosis is the following case:

In 1923, a physician, aged forty-two, consulted us because of skips in his pulse, which he had noticed for less than a year. A complete examination, including an electrocardiogram and frequent examinations thereafter, failed to reveal any abnormality except the extrasystolic arrhythmia. Three months before his death at the age of forty-nine, auricular fibrillation developed and a few weeks later there were signs of right heart failure with congestion. After the onset of fibrillation,

digitalis was given, but it was not possible to reduce his heart rate below 100, without the development of a coupled rhythm. These extrasystoles were so distressing that he finally asked to have the drug discontinued. At autopsy both coronary arteries were almost occluded with calcareous deposits and there was extensive fibrosis throughout both ventricles, thus affording a plausible explanation for the patient's intolerance of digitalis.

The above cases represent unusual, if not rare, causes of this common rhythmic disorder and illustrate the variety of etiological possibilities.

The clinical importance of extrasystoles is dependent upon many factors. Even when occurring frequently, they can never be interpreted as a sign of myocardial insufficiency, but merely as evidence of an irritable muscle. This is true whether the causes are extracardiac or cardiac. When due to neurosis, insomnia, alcohol, tobacco, or caffeine, they are a signal to change the patient's habits of living. They are sometimes a warning of a diseased thyroid gland or a chronic infection, and developing during digitalis administration, are a reliable cardiac sign of toxic doses. When associated with organic heart disease, extrasystoles may be interpreted as early evidence of heart strain, but nothing more. After forty-five, particularly if frequently repeated or occurring in series, the possibility of coronary sclerosis should be considered.

When symptomless, a drug merely to correct the irregularity is not indicated. If extrasystoles are annoying, and the cause cannot be removed, certain drugs are not only comforting but tend to lessen the development of other rhythmic disturbances. Quinidin sulphate, in 3 grain doses, two or three times a day, is usually effective. The use of potassium salts based upon pharmacological evidence of lessening cardiac irritability has been somewhat disappointing in my experience. The administration of digitalis to abolish extrasystoles is a common therapeutic error.

Paroxysmal Tachycardia

This is a disorder of rhythm in which paroxysms of rapid, regular heart action occur. Although the heart contracts regularly, it is a definite rhythmic disturbance because the impulses are not formed at the sinus node but at some other point in the wall of the auricle or ventricle. During the paroxysm, this new focus of impulse

formation, which is not under the influence of the nervous system, completely dominates the heart action—the normal pacemaker remaining in abeyance. These pathological impulses are probably nothing more than a series of extrasystoles.

The attacks come on suddenly and may last for periods of a few seconds or minutes, to hours or days. During the paroxysm, if the rate is quite fast, there is a fluttering sensation in the precordium, the blood pressure falls, and the disturbed arterial circulation usually produces dizziness, or a feeling of faintness. The diagnostic features are: abruptness of onset and termination of attacks, perfect regularity of contractions, and a rate, usually between 120 and 180, which is not affected by change of position or by emotion. Whether the attack is of the auricular or ventricular type cannot be determined without an electrocardiogram, but 90 to 95 per cent are of the auricular type, and in ventricular tachycardia the rate is slightly irregular.

Paroxysmal tachycardia begins and ends as a rhythmic disturbance without involvement of any of the other fundamental properties, and is a striking example of the circulatory effects of abnormal physiology of the heart muscle. It is not associated with any definite or demonstrable pathological changes, although attacks of the auricular type are not uncommon in mitral stenosis, and, moreover, ventricular tachycardia is an occasional complication of myocardial infarction. Either type may be caused by acute or chronic infection. The etiological factors are the same as in extrasystoles.

The prognosis in paroxysmal tachycardia of the auricular type is usually good. To use a Hibernianism, the patient recovers if the attack lets up. Death during an attack is rare, although I have seen one and a number are reported. In a majority of the cases, the attack lasts only a few minutes, and may not seriously interfere with the patient's activities. In prolonged attacks in older individuals there may be alternation of the pulse or no pulse, due to impaired efficiency of the myocardium. Moreover, the onset of the abnormal rhythm in patients of the coronary age may be accompanied by angina pectoris.

An illustrative case is that of a woman of 54, seen recently. The attack had begun seven days before with

a fluttering in her chest, followed in a few minutes by such severe precordial pain that $\frac{1}{2}$ grain of morphine had been given. Because of the severity of this pain a diagnosis of coronary occlusion had been made. Upon examination she was found to be slightly pale, restless, sweating, coughing, and there were numerous râles over the lung bases. The pulse could not be counted, although the apex rate was 178, as it had been on every count during the week. Shortly after the fourth 9-grain dose of quinidin, given at two hour intervals, there was a restoration of the normal sinus rhythm.

Ventricular tachycardia is one of the most serious rhythmic disturbances because of the possibility of its merging into ventricular fibrillation and sudden death. Three years ago, at the University of Kansas, a sophomore medical student, while taking his final examination in pathology, developed an attack of palpitation of the heart, accompanied by dizziness, nausea, and weakness. An electrocardiogram showed a ventricular tachycardia with a rate of 198. The attack subsided spontaneously in thirty minutes. A complete examination revealed no abnormality, except two badly abscessed teeth. He was advised to have these teeth extracted but failed to do so. One month later he suffered a second attack, while in bed, lasting forty minutes. A few hours after this, while sitting on a stool in the laboratory, he fell over dead. Microscopic examination of his heart showed a slight but definite acute myocarditis of the left ventricle. This case was reported in the *American Heart Journal* by Major and Wahl.

Various procedures may be tried for the relief of an attack, such as elevation of the arms above the head, pressure upon carotids or eyeballs, an ice bag over the precordium, and induction of vomiting. All these measures are worth while. Theoretically, digitalis or strophanthin, which in toxic doses may produce tachycardia, are contraindicated. To prevent recurrence of attack, the only drug of value is quinidin, given in doses of 3 grains, two or three times a day.

In ventricular tachycardia quinidin may be life saving. To prevent this serious complication in myocardial infarction, it is our practice to give quinidin early and continue it for 6 to 8 weeks, stopping if diarrhea or tinnitus appear. During a paroxysm of ventricular tachycardia, large doses are indicated, as much as 60 to 80 grains in twenty-four hours.

Auricular Flutter

This is not only the most rare but the least important type of arrhythmia. In flutter the auricles contract regularly and at a rate of 180 to 320 times per minute. The ventricular rate is usually about $\frac{1}{2}$, sometimes only $\frac{1}{4}$, the auricular rate. Auricular flutter cannot be recognized without the electrocardiograph, as there are no reliable clinical signs of auricular contraction. It may be suspected in an elderly individual having a persistently fast pulse, say between 100 and 180, and the diagnosis is quite probable if a pulse rate of seventy-five or eighty suddenly doubles following exercise. Regardless of the rate of the auricles, myocardial efficiency is not affected unless the ventricular rate is increased. The treatment is digitalis.

Auricular Fibrillation

This is the most interesting and in many respects the most important type of disordered rhythm of the heart. Clinical studies indicate that it is closely related to the arrhythmias just described, and that it is the terminal stage of an hyperirritable auricle. Whether this disorder of rhythm is due to circus movement, as described by Lewis, or to multiple foci of impulse formation in the auricular wall, as contended by the Germans, is interesting but of little practical importance in diagnosis, prognosis, or treatment. However, it is of the greatest importance to understand that the impulses are not formed at the sinus, that a fibrillating auricle remains in diastole, and that impulses pass in a haphazard manner over the junctional tissue to the ventricles, thus producing irregular and usually an increased rate of ventricular contraction. Fibrillation is a functional disturbance due to a combined derangement of the properties of irritability, rhythmicity, and conductivity of the auricular wall. This is not a condition of pathology but one of abnormal physiology, and its etiology, character and significance can be determined only from clinical studies.

In many cases the cause of auricular fibrillation cannot be determined. The two pathological conditions of the heart that may be considered etiological factors are mitral stenosis and coronary sclerosis. It is rarely found in syphilitic heart disease. Other causes are thyrotoxicosis, acute and chronic infections, major operations, adrenalin chloride, alcohol occasionally and

tobacco rarely. The etiological importance of overexertion, severe emotional disturbances and trauma are not sufficiently appreciated.

The two most important diagnostic features are rapidity and irregularity of the ventricular contractions. The apex rate as determined with the stethoscope may be ten to thirty beats more than the pulse at the wrist, thus showing a pulse deficit. Increased rate, 110 to 160, is the rule, although slow rates, eighty to ninety, may be found in elderly individuals or in the presence of disease of the bundle of His. An irregular pulse with an apical rate above 115 almost always means a fibrillating heart. Extrasystolic arrhythmia may be confused with slow fibrillation but extrasystoles seldom occur with a heart rate above 100 and careful auscultation will usually disclose a dominant rhythm. The most common early symptoms present in most cases are fluttering in the precordial region and breathlessness upon exertion.

When the heart beats irregularly, whether fast or slow, there is greater expenditure of energy, for obvious reasons, than with a corresponding rate and a normal rhythm. The serious circulatory phenomena that may arise in some cases from this disorder of rhythm alone, justifies considering auricular fibrillation a definite form of myocardial insufficiency. An illustrative case is the following:

Antoinette, a Polish girl of seventeen, was admitted to the hospital of the University of Kansas, in March, 1932. She had been breathless upon exertion and had noticed palpitation for three or four months. She had been in bed for two weeks and had been vomiting persistently for three days. The signs of mitral stenosis were present with an apical rate of about 178 and a totally irregular rhythm. There was neither edema of the feet nor enlargement of the liver, and no apparent evidence of any disturbance in myocardial function, except the abnormal rhythm. Yet the pulse could scarcely be felt, the extremities were cold, and there was a mild delirium, probably due to cerebral anemia.

At one p. m. she was given $\frac{1}{125}$ grain of ouabain intravenously. Seven hours later the dose was repeated—there having been no reduction in the heart rate. At midnight the pulse was 104 and the following morning her apex rate was ninety-two and she asked for breakfast. She has since married and is fairly active but takes her digitalis regularly.

This is rather an extreme case but it clearly illustrates that in certain cases of auricular fibrillation peripheral ischemia may be more important than venous congestion.

Prognosis.—The prognosis depends partly upon the cause and to a considerable extent upon the complications. Auricular fibrillation should always be considered a serious disorder—never a trivial one. Although I have had one patient under observation for twenty years, sudden death is not uncommon. Indeed, I have seen more than a few, and the dangers of embolic phenomena are always present regardless of the heart rate. The two most common complications are embolism and exhaustion of the cardiac reserve from overwork. Untreated, the increased rate and abnormal rhythm produce fatigue of the ventricle, loss of tone, the heart cannot adequately discharge its contents and the result is failure with congestion. This sequence of events in auricular fibrillation is quite obvious and relatively common. It would not be mentioned here if it were not for the fact there is an apparent fad with certain writers and teachers to minimize and even ignore all forms of cardiac arrhythmia. One author in a comparatively recent article refers to the period of the study of rhythmic disturbances as “the dark age of cardiology,” and speaks of auricular fibrillation as a myth. I am unwilling to concede as a myth any condition that will produce sudden death, or slow death from a clot on the brain—not to mention gangrene of a leg, or even a lingering death from cardiac dropsy and orthopnea.

One reason for such divergent views on the clinical importance of fibrillation is the nomenclature in cardiology. Many writers, by inference at least, leave the impression that the only form of myocardial failure of importance is congestive failure. At least for the general physician and for the student it is confusing to classify all forms of myocardial failure as simply anginal or congestive. Congestion is never an early symptom of a failing heart: it is usually the last one. Eighty-five per cent of the myocardial reserve is exhausted before congestion appears. The term “precongestive stage” applied to early symptoms may also be confusing because a patient may die from peripheral ischemia due to disturbed arterial circulation, without ever having developed dropsy or other sign of congestion. A good example is heart block. Another example is the occasional death from uncomplicated auricular fibrillation. In ventricular tachycardia or fibrillation venous congestion is certainly not one of the important clinical signs.

I am firmly convinced that rhythmic contraction is one of the important functions of heart muscle. I believe that abnormalities of rhythm should be considered as well as alterations of the other physiological properties in the study of an insufficient myocardium.

For the physician who has to diagnose his heart cases from the clinical history and physical examination it will be helpful to keep in mind that Mackenzie defined heart failure as “an inability of the myocardium to maintain an efficient circulation when an individual engages in his usual activities.” Based upon this definition all forms of heart muscle failure may be classified according to the disturbance in function of one or more of its fundamental properties as outlined earlier. This is a simple method of classification of heart failure for the general practitioner, and is sufficiently accurate for all clinical purposes. Most certainly if all the properties of the heart muscle are functioning normally, heart failure cannot exist. Occasionally insufficiency of the myocardium may be marked from impairment of a single property but frequently the derangement of one property sooner or later affects the others.

When fibrillation and right heart failure with congestion coexist, a careful history will usually show that the fibrillation appeared first. This is practically always true in goiter and usually so in other conditions. The object of treatment is not merely to improve the tone with digitalis but to lessen the strain on the muscle by controlling the rapid, irregular contractions of the ventricles. Even though the dropsy and other symptoms disappear, the digitalis should be kept up. A recurrence of the symptoms of congestion may be postponed for months or years by such management. The duration of life in a patient with auricular fibrillation, therefore, will depend almost as much upon judicious medication and an intelligent conception on the part of the medical adviser of the factors concerned in heart failure, as upon the associated pathological changes.

Treatment of Auricular Fibrillation

In paroxysmal fibrillation treatment may not be indicated. If the attacks are prolonged or recur frequently, the same treatment is given as for paroxysmal tachycardia. In established fibrillation, the only drugs of value are digitalis, strophanthin, or quinidin. Despite opinions to the contrary there appears to be both pharma-

cological and clinical evidence that the action of digitalis in fibrillation represents the very essence of cardiac therapy.

As stated previously, digitalis modifies myocardial function only by its action on the physiological properties of the heart muscle. This action is by no means the same in a heart with normal rhythm as upon one exhibiting auricular fibrillation. In the latter, conductivity is usually the first property affected—probably because of fatigue of the auriculo-ventricular bundle. The heart block thus produced allows fewer beats to pass from auricles to ventricles and the diastolic period of the ventricle is increased from perhaps $1/6$ to $3/4$ of a second. It is only in fibrillation that a reduction in rate may be confidently expected, and it is only in cases with this disorder of rhythm that a reduction in the rate may be used as a gauge to dosage. With very few exceptions, digitalis is indicated in established fibrillation regardless of the heart rate. The need is urgent if the rate is fast, and may be given to advantage even in a slow fibrillation to prevent increased rate following exercise.

The only possible exceptions to the rule—digitalis for fibrillation—are thyrotoxic hearts and in severe infections, such as pneumonia. When fibrillation is due to thyrotoxicosis I use digitalis but there are very good reasons why its administration may be legitimately questioned. A goiter heart is an irritable heart, and digitalis by further increasing this irritability may do harm. However, in therapeutic doses, the lowered rate resulting from depressed conductivity apparently offsets the possible harmful effects.

Digitalis and strophanthin are contraindicated in pneumonia except to reduce the rapid rate of fibrillation. Reliable statistics indicate that digitalis, especially in large doses, instead of supporting a heart with normal rhythm in pneumonia, actually increases the mortality 20 per cent. Moreover, a knowledge of the action of digitalis upon the fundamental properties of heart muscle shows why this alleged support has no pharmacological basis. The heart muscle in pneumonia is seriously affected by the toxins of

the disease and to accentuate the effects of these irritants with digitalis is dangerous therapy. We give digitalis or, preferably, strophanthin for fibrillation occurring during pneumonia but only about two-thirds the therapeutic dose. It should always be given cautiously and never in large doses. Neither digitalis nor strophanthin should be given to prevent fibrillation, as they may produce it.

Quinidin sulphate may be used to restore a sinus rhythm in certain cases of chronic fibrillation. Its action in fibrillation is probably the same as in extrasystoles, paroxysmal tachycardia, and auricular flutter. It has no effect on tone, and, indeed, is contraindicated in the presence of decompensation. The ideal indication for quinidin is in persistent fibrillation following thyroidectomy. We have used it with apparent success before thyroidectomy to prevent postoperative fibrillation. When fibrillation is due to such pathological conditions as mitral stenosis or coronary sclerosis, normal rhythm may be restored in about one-half the cases by the use of quinidin. The average safe dose is 4 grains every six hours. Although there are certain dangers in its use these are probably less than the existing hazard of embolic phenomena in chronic fibrillation.

Summary

A perfectly normal heart contracts rhythmically. All the irregularities discussed are closely allied and due to increased irritability of the heart muscle. The significance of any irregularity depends upon the type, its effects upon the efficiency of the heart muscle, the etiological factors and the age of the patient. Extrasystoles are of the least importance. Auricular fibrillation should be considered evidence of a serious disturbance of myocardial function that sooner or later results in a circulatory insufficiency. Digitalization should be maintained in all cases of fibrillation with a rapid rate to prevent fatigue of the ventricles. Quinidin by lessening irritability is the drug of choice to prevent or abolish rhythmic disturbance.

OUR CONSTITUTION*

HONORABLE JOHN P. DEVANEY

Chief Justice, State of Minnesota

Minneapolis

I COME to you tonight as a representative of one great profession speaking to the members of another great profession. Yours is a great and progressive group, perhaps the most intelligent group of citizens that could be gathered within the boundaries of our State. What I am going to say, therefore, concerns you very deeply. I believe that it is a proper criticism of the members of your profession to say that too often they are so deeply engrossed with their own affairs and with the details of their professional work that they do not take an active and, therefore, do not take an intelligent, interest in the affairs of their State and of their Nation.

I will, therefore, speak very briefly to you on a subject, which, while rather trite and perhaps often dull, is one that should be of the greatest interest to you all. That is the Constitution of your country!

We are living in troubled times. The world is at present disturbed and efforts are being made everywhere by all civilized nations to right these conditions and to correct the inequalities which today exist. This condition is not peculiar to your country. It is a condition with which the world is faced. Today we find our country passing through a period of transition and change—how great we do not know because our course is not charted and we do not know where we will finally end, and what the final development will be. We are in the hands of leaders who are bold, who are willing to experiment, who are willing to act boldly, and for that reason it is difficult to say just what changes will be effected in this country before we are through with what we are pleased to call this "NEW DEAL."

We live in the greatest nation on earth today—I think we can safely say that without fear of boasting—in point of population, in point of area, in point of favored location, in point of self-sufficiency, in point of wealth—perhaps the greatest civilized nation in the world's history, the only civilized nation in its history that has

ever solved its problem of production. Just consider that fact! Since man began to walk erect, since he began to gather in tribes throughout the development which has taken place over the hundreds of centuries, man has continually struggled with the problem of production, the problem of subsistence, everywhere throughout the world. This struggle for enough on which to live, for the necessities of life, for food, for clothing and for shelter, has gone forward and this is the first great nation in the history of the world that has solved this great and transcendent problem of civilization.

I heard a great scientist say, within the past few days, that this nation is now almost self sufficient. We can produce everything we need in abundance. We can produce thrice what we need for our more than one hundred thirty million people except for only five essentials. We can go forward to the development of whatever civilization and whatever plan we consider suited for our ultimate life's well-being. These five things are chromium, nickel, coffee, and two drug groups.

England, if blockaded for three weeks, would starve. Germany, Italy, France, all striving to solve this problem which we have conquered! Russia will never solve her problem of production. Russia lies two-thirds north of a latitude comparable to the latitude of Montreal. It suffers from famine year after year. It suffered from crop failures in 1930, 1931 and 1932. They were reduced to starvation rations in Russia by these three great crop failures. Russia will never be freed from the spectre of famine. It will never solve this great problem of production for its ever increasing millions.

Ours is a happier prospect and in this splendid Nation where we have solved our problem of production we can look forward hopefully to the solution of our other great problems. We can here build the finest civilization that the world has ever known, because we have a people who have a real conception and understanding of liberty. There are not many people in the world

*Address before the annual meeting of the Minnesota State Medical Association, Duluth, July 16, 1934.

today who have that conception. Nineteen nations live under Dictatorship. Perhaps only the English, the Scandinavian and part of the German-French and the people living in Western Europe, together with the people living in this country, have that true conception of liberty. I don't care what country your forefathers came from, the fact that they came here, the fact that you are here, is warrant enough that you have an understanding of that conception of liberty upon which this nation is built. The world must look to this country, to England, to the Scandinavian countries, to the people of Germany and of France, to preserve that conception of liberty for which people have fought for many centuries and upon which the future of the entire civilized world in my opinion depends.

Ours was the first written Constitution in the history of the world. Our Constitution, written September 17, 1787, by fifty-five earnest men who spent the summer from April to September, working earnestly together in Philadelphia, attempting to save this nation! That was a time of real emergency! Men weren't thinking then of material things. They were thinking of saving this country for which they had fought during the Revolutionary War and for which tremendous sacrifice had been made. They saw our nation disintegrating! They saw the thirteen Colonies falling apart! They saw the Bill of Rights suspended in four states, the right of trial by jury suspended in other states; they saw civil war in Massachusetts; they saw only two hundred thousand dollars collected in taxes in the year preceding 1787; they saw our treaty with France and England openly repudiated and men talking of returning to the monarchy! And so, when these fifty-five men gathered around this table in Philadelphia in 1787, it was to save this nation. This Constitution was written in time of emergency. We talk of emergency now, and talk of emergency legislation, and of decisions written in the light of emergency. Our constitution, the basic law of which I speak, was written in a time of the greatest emergency and in the light of emergency, and by these fifty-five men. Forty of them were under thirty-five years of age, three of them under twenty-five years of age, and only three of them over sixty years of age. Benjamin Franklin, eighty-one years of age, George Washington, Alexander Hamilton, Thomas Jefferson, all these men had sacrificed

their all for the Revolution and had seen this country fall apart under the Articles of Confederation. These men gathered there to make a last great attempt to save this nation! When they had finished, and when the Constitution was finally signed (and it was only signed by thirty-two of the fifty-five), on September 17, 1787, there wasn't a single new thing in it—not a single new idea save only the dual conception of government with residuary powers retained by the states and delegated powers to create a federal government. Where did the Constitution come from? The answer is that the Constitution of the United States had been in the making for a thousand years, yes, for ten thousand years! We get our law from England, no matter what country we come from, and so we look to England to see how the Constitution of the United States developed there through the history of England. We look back to the year 410 when the Roman Army invaded England, followed by the invasion of Germanic tribes, the Anglo Saxons and Goths, who drove the Celts before them into Scotland and Wales, and across the sea into Ireland, occupied the land and set up their own government, and so lived until Egbert in 815 made England a united nation—and then, down through the feudal times and down through the Norman Conquest,—England ruled by the Norman Kings until the year 1215, when we see our Constitution for the first time taking definite form when the Magna Charta was written. On an island north of London, in the Thames River, at Runnymede, the freed men of England, the Saxon Barons, at the point of the sword, wrung from King John and the Norman nobles that great charter of rights which they called the "Magna Charta." At Runnymede we secured the right of trial by jury. You hear people talk and sometimes criticize the right of trial by jury. It has served them these seven centuries, and thinking people, I don't believe, would give it up today for all they possess! We secured there, seven centuries ago, the right of personal liberty and the right of protection of property. Many times Englishmen lost those rights! Many times they were taken away from them by despots, but always won back with greater rights and down through the centuries they fought continually for their Constitution, for their rights—a continual fight between the people on the one hand, and the nobles on the other.

Another great step forward toward the foundation of our Constitution was the Petition of Rights of the year 1629. Since the year 1669, which the English call the year of their glorious revolution, when they secured the establishment of Parliament in its present form, and when they secured their Bill of Rights, the right of religious freedom, the right of free speech, the right of free press, the right not to permit the King to quarter soldiers upon them, the right to govern themselves, to control peace and war, the English people have been a free people and have been a self-governing people. Then they turned to the establishment of the colonies in America, and these twelve colonies (there were not thirteen originally, but twelve) were established under royal charter. They were not ruled by Parliament, and when these colonists came to America to establish these colonies under English rule, their first act was to again re-write their Bill of Rights. The most treasured thing which they possessed was the restatement of their Bill of Rights, the right of religious freedom, the right of free press and free speech, and all these other great rights. Of the twelve colonies, each one had a Bill of Rights. Some colonies that established their own government and their own Assemblies had divided their government into the Legislative and Judicial and Executive, and so even that idea was not new in the Constitution. There was much discussion while the Constitution was taking form and it was written after much difficulty. It was only saved on the last night by the eloquent speech of Benjamin Franklin, eighty-one years of age, in which he said:

"There are many things in the Constitution, which I do not like, which I do not at present approve and I am not sure that I will ever approve them, for having lived long I have experienced many instances of being obliged on further information and a fuller consideration to change opinions even on important subjects."

It was his wish that he might live a hundred years to come back and see how the people of this nation had developed under this Constitution. They had not only given them a Constitution, but had given them the machinery by which to change it. He expected there would be a nation here of a hundred million people. He had looked forward and had foreseen this tremendous development which afterwards took place. He hoped and believed that this Constitution would grow and change as the nation grew and

changed—would grow and change to suit the changing needs of a changing people!

The Constitution as written was the thing for which people had fought, for seven centuries, and it was but a restatement of all the great rights which a free people possessed. We breathed new life in it! We put it into written form! We made it the cornerstone of our nation and the foundation law of our land. We made it the first written Constitution in the history of the civilized nations of the earth, and I think that when we want to have people understand the Constitution, when we want to teach it, when we want to have the man in the street revere the Constitution and fight for it and defend and respect it, we want to tell him that it is his Constitution, that it is his Magna Charta, that it is his Bill of Rights, that it is his Petition of Rights, that it is the thing that guarantees him the right to go to church free and unmolested on Sunday, that it is the thing that guarantees him the right of trial by jury, free speech and free press, and it is my belief that if you teach people that this Constitution is their Constitution, that it is their Magna Charta, that it is their Bill of Rights, that you need have no fear for the future of this nation. We are going forward to whatever changes and whatever developments may take place, peacefully and in an orderly way. We are going forward to that time when all people will be able to live a better and a fuller and a more significant life. We are going forward to those changes lawfully under the Constitution and through the agency of that machinery which was set up by the men who originally wrote that great document.

Bryce said it was the "greatest body of men that ever sat in single chamber." Gladstone said it was "the greatest document ever struck off by Human hands at one time," and when he said that he was thinking of all of the great documents of history written at various times in the development of the English Constitution.

When the makers of the Constitution were through with its writing, and when these men had returned home, John Hancock and Samuel Adams wrote back to Washington and to Franklin that the Constitution could not be ratified in Massachusetts, and they were asked "why." They said because it does not contain an exact restatement of the Bill of Rights, the right to go to church when and where you want to go, the right

to speak as you will, the right to criticize the President of the United States if you will, the right of free speech, the right of free press, the right of trial by jury, and Hancock and Adams being the Radicals of their time said, "you must amend this Constitution," and so, before the Constitution was submitted to the voters of the various Colonies, it was amended ten times,—ten times in its first year of life,—ten times before it was finally adopted by the thirteen colonies and became the basic law of the land!

I like to read and I like to think of the Constitution of the United States as it has been spoken of by that great liberal, one of the greatest judges who has ever sat upon the Supreme Court Bench,—Justice Oliver Wendell Holmes. His conception of the Constitution as written in the case of *Abrams vs. U. S.*, 1919, is as follows:—

"When men have realized that time has upset many fighting faiths, they may come to believe even more that they believe the very foundation of their own conduct that the ultimate good desired is better reached by free trade in ideas, that the best test of truth is the power of the thought to get itself accepted in the competition of the market, and that truth is the only ground upon which their wishes safely can be carried out. That, at any rate, is the theory of our Constitution. It is an experiment, as all life is an experiment."

I believe that the great problem which faces this nation today is to bring home to our citizens of all classes, an understanding of the real meaning of the Constitution, teaching them that the Constitution is not the document of the proper-tied class, or the improper-tied class, that without it they would not be free men, that this nation was founded upon that conception of liberty and that their Constitution is a growing, and a breathing and a living document, and that it can grow to suit their changing needs. You should read it thoughtfully. You should talk the Constitution! The schools should talk it, the press should talk it, the men of your profession have a duty with respect to it, and I say when you actually come to the time when you teach all people that this is their shield against oppression, there need be no fear in this country of revolution. I think this is a great document that we are privileged to hand down to our children. There is no greater heritage than this heritage which was won by many centuries of fighting, which was won over a struggle which goes back into two thousand years of English history. This Constitution is a great document! It is worth revering. It is worth upholding,—but most of all and particularly for the intelligent and educated people, I believe it is worth understanding!

THE PUBLIC INTEREST IN PROFESSIONAL STANDARDS*

HARRY H. PETERSON

Attorney General of Minnesota

Saint Paul

YOU have extended to me a great privilege by inviting me to make this address. I appreciate the honor very much. The subject of my address, "The Public Interest in Professional Standards," suggested itself by reason of recent public discussion of this important subject and by recent litigation involving this question, in which I, as Attorney General, appeared as counsel. This subject has been made of immediate and particular interest by efforts to strike down the Basic Science Law of Minnesota by having it declared to be unconstitutional and by attempts to evade its provisions by the practice

of medicine by corporations and laymen in violation of its provisions.

Thus, on the one hand, has the importance of professional standards been brought into question by an attack on the law, which has for its purpose the maintaining of scientific standards in medicine and surgery, and on the other hand, the importance of this law is emphasized by the attempts to nullify it by evasion of its provisions. That the public has an interest in these questions seems to be self evident. The fact that laws providing for scientific qualifications, for the practice of medicine and surgery, and for their strict enforcement, have been enacted, strongly suggests that the public has an interest

*Address before the annual meeting of the Minnesota State Medical Association, Duluth, July 17, 1934.

in professional standards. It is this question which I propose to briefly discuss.

Laws can be justified only upon the grounds that they promote and achieve public purposes and result in public benefits. To the extent to which these ends are accomplished are laws desirable. It seems rather obvious that our laws providing for Basic Science qualifications and special learning, study and training in medicine and surgery, evidenced by a diploma from an accredited medical school and by a license to practice from the State Board of Medical Examiners after due examination, have for their purposes, first, that only those who possess the requisite learning, training, ability and character shall be permitted to practice medicine; second, that these qualifications shall be grounded and based upon scientific knowledge; and, third, that public protection against incompetents, humbugs, frauds and quacks is best promoted and achieved by such requirements.

It seems to me that one of the great struggles of the race, beginning even before the dawn of recorded history, has been its fight against disease, and the consequent suffering, misery and death. From earliest times this struggle has been carried on by the medical profession as a special class of men set aside from the rest of the world for this purpose, in whom society has entrusted the function and art of healing. The history of mankind shows that this has been a hard and costly struggle, characterized by an onward march of progress from the dark days of ignorance and superstition, the days of the medicine man, priest and barber surgeon, with their terrible cost in human suffering, disease and misery to the present day of scientific medicine, which has to a large extent conquered disease and pestilence and alleviated human suffering and misery, with still greater conquests to be accomplished in the future. The present position of medicine and surgery and its accomplishments and achievements are due almost entirely to learned and scientific standards or qualifications imposed upon its practitioners, who through successive ages have waged the war from darkness to light, from ignorance to science, and carried on in the spirit of science and humanity.

The law has, from the earliest times to the present, regulated the practice of medicine and surgery in one way or another. At first there was no attempt to confine the right of practice to those who were qualified. At common law

anybody could practice medicine and surgery. That accounts for the barber surgeons. It was thought that the public was amply protected by liability for malpractice or negligence on the part of practitioners and by the right of the government to proceed by quo warranto to prevent incompetents from practicing the medical profession.

Such rules, of course, were utterly inadequate to protect the public. They failed to keep out those who were unfit to practice medicine and surgery. It was found that many sincere but incompetent men were practicing a profession to which the public has entrusted matters of health, life and death. Quacks and charlatans exploited the people by trickery, by claims of miraculous cures and by mysterious rites. The people did not know who was competent and who was not. No means of knowing were readily available. To deal with these conditions laws along modern lines were enacted, regulating the practice of medicine and surgery and providing for educational requirements, and furnishing evidence to the public of such facts by the issuance of licenses to practitioners.

In a large sense the immediate object of such legislation was the protection of the public by excluding from the medical profession those who were unfit to practice it. Such laws were not primarily intended to promote the interests of medical schools nor to protect practitioners from competition nor to advance the interests of the medical profession as such. The Supreme Court of Nebraska, in the interesting case of *Lincoln Medical College, etc., v. Poynter*, 60 Neb. 228, 82 N. W. 855, said:

"The purpose of the law is not to protect medical schools or medical practitioners from competition in business. It is a police measure, designed, as was said in *State v. Buswell*, 40 Neb. 159, 58 N. W. 728, 24 L. R. A. 68, to prevent imposition upon the afflicted by quacks and pretenders."

The Supreme Court of the State of Minnesota, in the Basic Science Case of *State ex rel. Shenk v. State Board of Examiners*, 189 Minn. 1, 250 N. W. 353, said that the court was not interested in the extent to which the medical profession may have sponsored the law nor its motive in doing so.

Such laws are upheld on purely public grounds. The best statement of the rule was made by the Supreme Court of the United States

many years ago in the case of *Dent v. West Virginia*, 129 U. S. 114, pp. 122-123:

"Few professions require more careful preparation by one who seeks to enter it than that of medicine. It has to deal with all those subtle and mysterious influences upon which health and life depend, and requires not only a knowledge of the properties of vegetable and mineral substances, but of the human body in all of its complicated parts, and their relation to each other, as well as their influence upon the mind. The physician must be able to detect readily the presence of disease, and prescribe appropriate remedies for its removal. Every one may have occasion to consult him, but comparatively few can judge of the qualifications of learning and skill which he possesses. Reliance must be placed upon the assurance given by his license, issued by an authority competent to judge in that respect, that he possesses the requisite qualifications. Due consideration, therefore, for the protection of society may well induce the State to exclude from practice those who have not such a license, or who are found upon examination not to be fully qualified."

"No one has a right to practice medicine without having the necessary qualifications of learning and skill; and the statute only requires that whoever assumes, by offering to the community his services as a physician, that he possesses such learning and skill, shall present evidence of it by a certificate or license from a body designated by the State as competent to judge of his qualifications."

Not only may there be requirements of learning and ability, but also of personal qualifications of honor and good moral character. Our Supreme Court has so held in *State v. State Medical Examining Board*, 32 Minn. 324, 20 N. W. 238, 50 American Reports 575, wherein it said:

"But the legislature has surely the same power to require, as a condition of the right to practice this profession, that the practitioner shall be possessed of the qualification of honor and a good moral character, as it has to require that he shall be learned in the profession. It cannot be doubted that the legislature has authority, in the exercise of its general police power, to make such reasonable requirements as may be calculated to bar from admission to this profession dishonorable men, whose principles or practices are such as to render them unfit to be intrusted with the discharge of its duties."

It is sometimes claimed that it is not in keeping with our democratic ideals to insist upon high standards of professional training for admission to the practice of medicine and surgery. The answer is that the public is entitled to the best possible service and it is only by requiring the best possible service that the health of the people can be protected. Dr. Nicholas Murray

Butler of Columbia University expressed this same thought vigorously and tersely in the following sentence:

"A Democracy is under no obligation to be served by ignoramuses."

While it is undoubtedly true that such legislation, regulating the practice of medicine, was grounded upon considerations of benefits to the public, it is also true that legislators recognized that such laws may properly promote the interests of the medical profession. The promotion and protection of the interests of the profession are justified in turn upon the grounds that by so doing society advances its own interests. This is accomplished by establishing and maintaining a learned, well trained and qualified body of practitioners, to whom the members of society commit the most vital matters of health, treatment for disease and injuries and even life itself.

The Supreme Court of Minnesota in the *Basic Science Case*, speaking by Mr. Justice Stone, paid eloquent and well deserved tribute to the steady advance and the accomplishments of the medical profession, in the following language:

"We are not interested in the extent to which the medical profession may have sponsored the law nor their motives in doing so. It is enough that, since the days of Hippocrates through those of Galen, Vesalius, and their modern successor anatomists, there has been great progress and splendid accomplishment in their science and the related arts of diagnosis and treatment. Lawmakers everywhere have taken note and have been doing so for a century or more. They began with laws facilitating the procuring of human bodies for dissection. Thereby doctors and their students were enabled to transfer their patronage from grave robbers, 'body snatchers,' to legitimate purveyors of cadavers. Other laws, regulatory and otherwise, followed. Finally came the restrictive regulation, through licensing, now familiar law everywhere. The basic science statute is the latest addition thereto. It departs somewhat from the older definition of the practice of medicine. Of its newer and broader category of the practice of healing, naturopaths have no complaint on constitutional grounds."

The *Basic Science Law* has for its purpose the requirement of knowledge on the part of all practitioners of the art of healing and of certain basic sciences, the better to qualify them from a scientific point of view for the important duties committed to their care. Such a law is in keeping with the history, best traditions and the ideals of medicine and surgery.

It is most significant, in my judgment, that the right to practice medicine and surgery is denied to corporations. It was expressly so held by our Supreme Court in the case of *Granger v. Adson*, decided November 3, 1933, 250 N. W. 722. Charters of corporations have been ordered forfeited in quo warranto proceedings in cases in which corporations attempted to practice medicine either directly or indirectly. One of these cases was decided in the District Court of Ramsey County, *State ex rel. Attorney General v. Pioneer Health & Benefit Insurance Co.*, and the other in the District Court of Hennepin County, *State ex rel. Attorney General v. Medical Service Co.* The denial to corporations of the privilege of practicing medicine and surgery is significant because it emphasizes that the practice of medicine and surgery is a profession and not an ordinary trade or business, and that human experience has found that corporations are unfitted to discharge the high duties and functions of a physician and surgeon. I think that it may be safely asserted that the public generally believe that their interests as individuals and as members of society are best secured and promoted by limiting the right to practice medicine to individual physicians and surgeons whose labors are according to accepted standards and the ethics of the profession.

It seems to a layman—perhaps I am treading on dangerous ground in expressing an opinion—that the history of medicine and its onward march in the alleviation, cure and conquest of disease, human misery and suffering, with its brilliant achievements in all spheres of professional endeavor, private medicine and surgery and public health, is the story of the labors, discoveries, improvements of technic and achievements of individual laborers in the profession. This opinion is also expressed by Garrison, in the following language:

"Thus the history of medicine is also the history of human fallibility and error. The history of the advancement of medical science, however, is the history of the discovery of a number of important fundamental principles leading to new views of disease, to the invention of new instruments, procedures and devices, and to the formulation of public hygienic laws, all converging to the great ideal of preventive or social medicine; and this was accomplished by the arduous labor of a few devoted workers in science. The development of science has never been continuous, nor even progressive, . . . *It is no exaggeration to say that*

science owes most to the shining individualism of a few chosen spirits."

The achievements of the profession are associated with the names of the men who have made them possible. They are like stars lighting up the firmament. We think of Hippocrates and Galen, Leonardo De Vinci and Vesalius, Harvey, Leeuwenhoek, Jenner, Pasteur and Lister, Koch, Klebs, the Mayos, Wassermann and Ehrlich, Dicks and Banting, Goldberger and a score of others. Some of the names mentioned tonight may take their place in the future with those that I have enumerated. It probably is not too much to say that the progress and achievements of the future will be the result of the labors of members of the profession working as individuals in the solution of specific problems.

Love of humanity, human sympathy, humane instinct and a spirit of service have been the impetus to the labors which have made medical progress and achievement. An all abiding loyalty to the cause of human kind, transcending states and nations, not counting the cost of labor and sacrifice, has characterized these generous sentiments. The laboratory, the test tube and the microscope have been but the instruments with which the scientist has worked. The genuine scientist and physician, although appreciating the true service and worth of his tools, has not permitted them to displace the fundamental and humane instincts which have moved men so to labor and so to sacrifice in the cause of science that all labor, all sacrifices and all achievements have had a humane end in view, namely, the cure, prevention, and conquest of disease and human suffering. These ends justify the maintenance of professional standards because the most important interests of the race, namely, good health and the prevention of disease, are thereby protected and promoted.

Corporations cannot rise to this human feeling, this motive for human relief and betterment, which characterizes the true physician. They have no souls. They have no personalities, no human qualities. They have no social—nay, no professional—standards or outlook. To permit them to practice medicine is to strike a blow at those human qualities which characterized every good physician and surgeon, and to which the public is indebted for the labors and the achievements of the profession.

Conclusion

The interest of the public and of the medical profession are thus found to stand on common ground. The public is interested in professional standards for its own protection. This has been accomplished by excluding the unfit from the practice of medicine and permitting only those who are qualified to practice. The public, moreover, is interested in maintaining a learned, well trained and scientific medical profession, not only for its immediate protection but also to insure the progress and onward march of medicine. Incidentally the members of the medical profession are protected from the unfair, and in many instances the ruinous, competition of the quack and the charlatan. Protection of the profession tends to compensate for the public advantages thus gained.

In closing permit me to quote a paragraph from Oliver Wendell Holmes, in which he touches on the duties, the spirit of service, and the rewards of the profession, consequent on the maintenance of professional standards:

"Duty draws the great circle which includes all else within it. Of your responsibility to the Head Physician of this vast planetary ambulance or traveling hospital which we call Earth, I need say little. We reach the Creator chiefly through his creatures. Whoso gave the cup of cold water to the disciple gave it to the Master; whoso received that Master received the infinite Father who sent him. If performed in the right spirit, there is no higher worship than the unpurchased service of the medical priesthood. The sick man's

faltering blessing reaches heaven through the battered roof of his hovel before the *Te Deum* that reverberates in vast cathedrals."

Professional standards tend to secure that high and scientific medical service, which we seek and which we hope to promote, rendered in that high sense of duty and which assures us that we can look forward to many great conquests and accomplishments of the profession in the future which will bless humanity. It is these benign results which are the result of professional standards and which are at the basis of the public interest in professional standards in medicine and surgery.

Permit me, also, to say in closing that, as the Attorney General of the State, I have had most pleasant relations with the medical profession. Your requests have been fair and reasonable. Your officers, the members of the State Board, your secretary and your attorney, Mr. Manley F. Brist, have been most helpful. Their efforts have been commensurate with the problems with which we have had to deal. I have enjoyed working with them. I want you to know that I appreciate these men. They are too self-effacing and modest to tell you about their own splendid work. My telling you is probably your only way of learning the fact.

I trust that our pleasant and cordial relations may continue and that your labors in the future will bring you those rewards which you so justly deserve.

DISSEMINATED LUPUS ERYTHEMATOSUS*

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THIS report correlates the data from laboratory and clinical observations of a group of forty-seven patients with disseminated lupus erythematosus, observed during the past ten years. Consideration of this material emphasizes the fact that this group of cases presents a variety of symptoms, laboratory findings, and pathologic states which, when gathered together,

form a mass from which few significant etiologic facts may be gleaned. Nevertheless I feel that the presentation from time to time of such data is warranted, especially in regard to a disease that has such a high degree of mortality and against which our knowledge has proved so unavailing.

For didactic purposes lupus erythematosus may be classified as follows: (1) the chronic discoid, or fixed type, (2) the generalized discoid

*From the Section on Dermatology and Syphilology, The Mayo Clinic, Rochester, Minnesota. Read before the Minnesota Academy of Medicine, February 14, 1934.

or chronic disseminated type, (3) the subacute disseminated type, and (4) the acute disseminated type.

The chronic discoid type is the most common. The erythematous, scaly, well-demarcated, pruritic, and sometimes indurated, plaques confined



Fig. 1. Subacute disseminated type. Lesions on chest, and alopecia may be noted.

to the nose and cheeks are commonly known. The epithelial plugging and the atrophy of the plaques are characteristic findings. The distribution of the lesions on the front of the face has led to the use of the term "butterfly type of lupus erythematosus." In addition, the lesions may be found on the scalp, lobes of the ears, lips, and on the mouth. This type of the disease is characterized by its chronicity, persistence, and the disfiguration it causes.

Generalized discoid lupus erythematosus, or chronic disseminated lupus erythematosus, differs from the localized discoid type in that the erythematous plaques are found not only on the face but also scattered elsewhere on the body.

The upper portion of the thorax and the neck, the hands, arms, and occasionally the upper portion of the back may be involved. In the fixed and the generalized types of discoid lupus erythematosus, constitutional symptoms are lacking.

The disseminated types of lupus erythematosus appear in two forms: the rapidly progressive and fatal, acute type, and the milder, less intensive, subacute type. It is to these two manifestations of disseminated lupus erythematosus that the remainder of this report will be confined.

Summary of the Literature

The literature indicates that disseminated lupus erythematosus was first described by Kaposi in 1872. In 1931, Madden presented a group of nine cases of acute disseminated lupus erythematosus from the University of Minnesota, in three of which necropsy was performed, and he reviewed the literature to date. At the same time Mook, Weiss, and Bromberg reported a group of thirteen cases of lupus erythematosus disseminatus, of which four came to necropsy. As these authors have culled the significant facts from the literature I shall avoid repetition, and I refer the interested reader to these papers.

The published data on lupus erythematosus disseminatus of the acute and subacute types may be summarized briefly as follows: In acute disseminated lupus erythematosus there is a high mortality rate, the duration of the disease varying from a week to a year or more. The subacute types of the disease pursue a slower, milder course characterized by remissions from both the constitutional and cutaneous symptoms; in these cases there is a lower death rate. Studies of the etiology of the disease reveal that many concepts have been expounded but that no conclusive etiologic facts have been found. Disseminated lupus erythematosus has been attributed to pulmonary tuberculosis, tuberculous adenopathy, streptococci, sensitivity to light, trauma in the form of drugs and heat, toxic factors, injury to the superficial cutaneous blood vessels, focal infection, disease of the reticulo-endothelial system, and to disease of the bone marrow; nor is this a complete list of all the reported etiologic agents. The idea that tuberculosis was an etiologic factor in the disease is due to the fact that tuberculosis in one form or another was demonstrated in a fair proportion of cases; however, more recently there has been a tendency to mini-

mize the significance of the finding of tuberculosis in these cases. Many published case reports have contained records of patients who have had tuberculosis of the glands, lungs, or kidneys, and in some instances the bacillus of tuberculosis has been recovered from one of the

than its cause. The various other etiologic theories, such as of focal infection, involvement of the reticulo-endothelial system, and so forth, have not as yet accumulated sufficient evidence to accredit them. Leukopenia, formerly thought always to be associated with the disease, is now

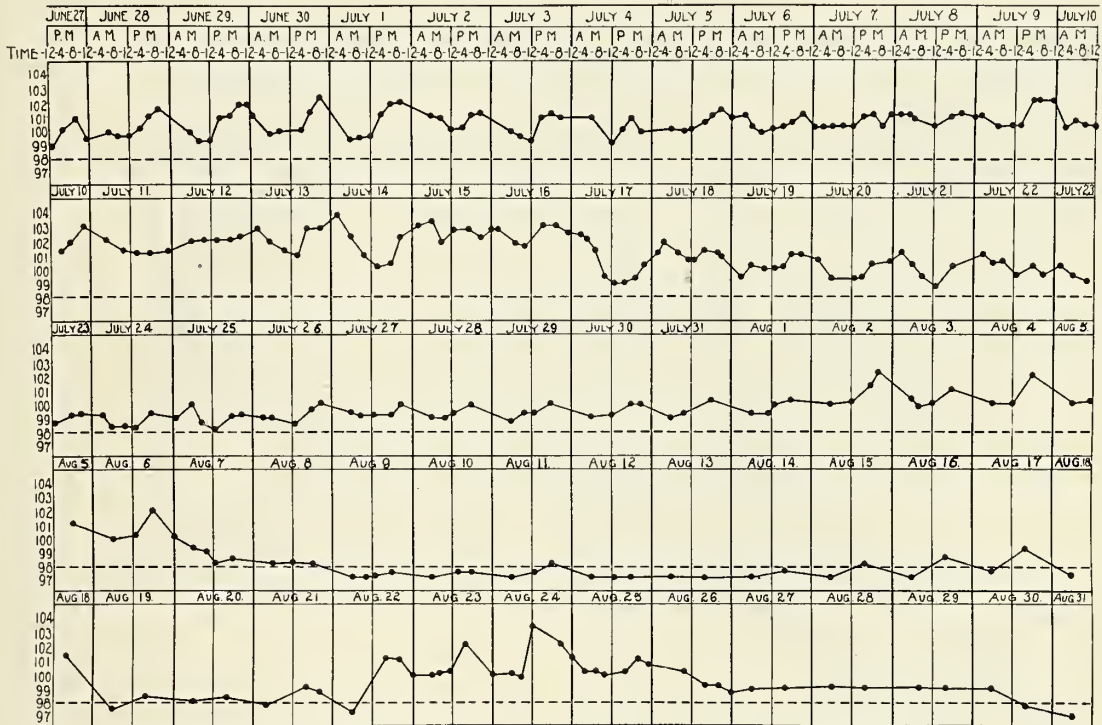


Fig. 2. Lupus erythematosus disseminatus. Typical septic type of temperature chart.

viscera, but it has not been recovered from the skin. Kren and Löwenstein reported a high incidence of positive blood cultures of *Bacillus tuberculosis* in disseminated lupus erythematosus, but the work has not been confirmed in this country by Laymon and by others. Likewise, the data in regard to the etiologic significance of the streptococcus or staphylococcus have not been conclusive. Goeckerman emphasized the possibility that the combined effects of the bacillus of tuberculosis and streptococci might cause the disease. The incidence of positive blood cultures and the variety of the organisms obtained have made this finding to date of only presumptive significance. Photosensitivity is quite common in these patients, but it is not possible to explain the findings at necropsy and the symptoms which these patients present on the basis of sensitivity to light alone. Photosensitivity seems to be a feature of the disease rather

known not always to be present; when noted, however, it is evidence of a severe degree of involvement and usually indicates a rapidly fatal outcome. Montgomery and Goeckerman believed that the histopathologic picture of disseminated lupus erythematosus was specific and accordingly urged that biopsies be done in all questionable cases. From the evidence that has been accumulated thus far it appears that the syndrome of disseminated lupus erythematosus is that of toxemia, probably attributable to an infectious agent.

Symptoms

As the acute and subacute types are manifestations of varying degrees of the same disease, their symptoms will be discussed simultaneously (Fig. 1). The disease may be insidious in its onset, the patient frequently complaining of fatigue, exhaustion, and disability for months

before the cutaneous signs appear; or the onset may be abrupt, with the constitutional and cutaneous signs appearing simultaneously. Excessive fatigue is one of the outstanding complaints, often leading to the diagnosis of "chronic nervous exhaustion."



Fig. 3. Acute disseminated type.

Fever is a common finding. At first, it is slight, with a rise in the afternoon; then, when the disease becomes developed, the temperature may approximate 103° F. or higher, and remain elevated throughout the disease (Fig. 2). As a rule, persistent hyperpyrexia is an earmark of the fatal case. Pain in the form of arthralgia, myalgia, or neuritis appears early and may be severe. As the disease progresses, prostration and exhaustion become marked, and, when combined with the fever and profuse perspiration, give a picture of an overwhelming toxemia. Dermatitis and its attendant symptoms add materially to the picture of severe toxemia.

Gastro-intestinal symptoms, with diarrhea, loss of appetite, nausea, and vomiting may further confuse the clinical picture. The loss of weight is not marked until the disease is quite well advanced. It is not unusual to find the subacute

type of the disease in a moderately obese individual.

Dermatitis

The dermatitis starts on the face or upper part of the thorax and neck as an indefinite superficial erythema which shortly becomes well-demarcated. Rapid extension of the dermatitis in this form may occur in the acute case, or the lesions may remain as discrete papules. In certain cases papular and bullous lesions may develop, the latter giving the appearance of pemphigus. In the cases of chronic discoid lupus erythematosus in which dissemination takes place as a result of trauma from irritating applications, sunshine, or ultra-violet light, the scaling erythematous plaques with the epithelial plugging and the superficial atrophy are to be found in conjunction with the newly forming erythematous areas. In the cases in which the chronic discoid lesions were not present previous to the development of the disseminated lupus erythematosus, the differential diagnosis may be more difficult, because the indurated plaques with the characteristic epithelial plugging, scaling, and atrophy are missing from the region of the nose and cheeks. Instead, the plaques are but slightly scaly and the plugging is insignificant. The lesions on the extremities are more discrete than those on the face; the red color is more livid in the subacute cases, whereas it is quite bright in acute types, since as new lesions develop they often simulate a first degree burn. In addition, the lesions on the extremities have multiform outlines and are to be distinguished from the more commonly seen erythema multiforme. In the severe cases the development of new lesions may continue until the face, forearms, neck, and the upper portion of the thorax present a confluent form of dermatitis with edema of the face, puffy eyelids, and alopecia (Figs. 3 and 4). Pruritus, burning, and tenderness, of varying degrees accompany the new lesions. As the intensity of the disease increases bullæ may become manifest, or, more rarely, hemorrhagic lesions may develop. The edema of the face and head, associated with the dermatitis, is always pronounced in the severe cases (Fig. 5). It has been my experience that the presence of the edema in association with the dermatitis usually indicates an unfavorable outcome. On the other hand, the extent of the dermatitis is not always propor-

tionate to the severity of the disease, as patients have succumbed rapidly to disseminated lupus erythematosus with but a small amount of dermatitis, and, likewise, they frequently die during remission of the dermatitis. Accordingly, it is impossible to prognosticate the course of the dis-

ensue even while there is an apparent remission, or a recurrence of the dermatitis and constitutional symptoms may again incapacitate the patient. Diseases of the viscera of one type or another are numerous and varied in disseminated lupus erythematosus. Nephrosis, nephritis, pneu-



Fig. 4 (left). Acute disseminated type. General examination negative.
Fig. 5 (right). Acute disseminated type. Edema and marked crusting.

ease from the extent of the dermatitis, but the intensity of the dermatologic manifestation may be a valuable guide as to the eventual outcome.

Residual pigmentation is a feature of disseminated lupus erythematosus, and if remissions develop, the pigmentation may remain for several years. Likewise, atrophy is to be noted as the dermatologic process involutes. Alopecia of the scalp, eyebrows, and pubic area is usually present in the severe cases.

Course of the Disease

Mention has already been made of the fact that in the acute cases the progress of the disease is rapid and that death may ensue in from two weeks to approximately a year. In these cases remissions do not develop and the course is progressively unfavorable. In the milder types of the disease, with slight constitutional symptoms, remissions are not uncommon, during which time residual pigmentation and atrophy are accompanied by varying degrees of fatigability and exhaustion. Death may rapidly

monia, meningitis, pleurisy with effusion, ascites, pericarditis, mastoiditis, endocarditis, and varieties of tuberculosis have been encountered in these cases.

There have been two cases in this group in which acid fast bacilli (tubercle?) were recovered from the urine. In both these cases the bacilli were not present constantly but appeared in showers at irregular intervals accompanied by accentuation of the constitutional symptoms.

The presence of foci of infection in the teeth, tonsils, or prostate gland is readily demonstrated in most of the cases. I mention foci of infection at this point because of the severe sequelæ or even fatalities that may follow the injudicious manipulation of such foci. Goeckerman has already emphasized the need for great caution in this regard. It is my practice, for example, to remove one tooth at a time and to note the reaction, and to allow a week or more to pass before continuing with the extractions. If possible, the removal of foci should be done while the patient is in a state of remission.

Pneumonia has been the most common cause

TABLE I. FINDINGS AT NECROPSY IN TEN CASES OF ACUTE DISSEMINATED LUPUS ERYTHEMATOSUS

Case	Age, years and sex	Tuberculosis	Lungs	Heart	Spleen
1	62 F	Healed tuberculosis of lung and mesentery	Bronchopneumonia		Multiple infarcts
2	16 F	Tuberculous mesenteric lymphadenitis; bacillus of tuberculosis found on smear; tuberculous enteritis and peritonitis	Lobar pneumonia (right); bronchopneumonia (left); pneumococcus type 2	Anemic infarct	Miliary tuberculosis; chronic perisplenitis
3	34 M	Healed tuberculosis of hilum, nodes and lung	Healed tuberculosis; bilateral bronchopneumonia		Multiple infarcts
4	58 F	Healed tuberculosis of pleura and mesentery	Terminal bronchopneumonia		
5	40 F	Granuloma of lungs (tuberculosis?)	Granuloma of lungs (tuberculosis?); pleural adhesions; hydrothorax	Hypertrophied	Passive congestion
6	22 F		Edema	Endocarditis; terminal vegetative endocarditis; fatty myocardium	Many infarcts
7	31 F		Edema and congestion	Rheumatic aortic and mitral endocarditis; subacute bacterial endocarditis with septic infarcts; hypertrophy	Septic infarcts; mild hypertrophy
8	21 F		Terminal bronchopneumonia; bilateral hydrothorax; edema and hemorrhage	Hypertrophy of left ventricle; fatty myocardium	
9	19 M		Terminal bronchopneumonia with edema		
10	24 F		Terminal bronchopneumonia; edema and congestion	Fatty myocardium; pericardial effusion	Moderately enlarged

of death and caution must be exercised to prevent possible exposure to respiratory infections. Splenomegaly was found clinically in three cases, and hypertrophy of the liver in four.

In addition to the complications already noted, I have seen subacute disseminated lupus erythematosus associated with psoriasis, Raynaud's disease, hyperthyroidism of the exophthalmic type (in which thyroidectomy was successful and decidedly beneficial in one case), pregnancy in four cases (which terminated successfully in each), scleroderma, and with carcinoma of the larynx. In the differential diagnosis pellagra, erythema multiforme, erysipelas, dermatitis from drugs, and photosensitivity must be considered.

In my series there are twenty cases of acute disseminated lupus erythematosus of which ten came to necropsy, and twenty-seven of subacute disseminated lupus erythematosus in none of

which necropsy was performed. It is my purpose to record briefly the findings at necropsy in these ten cases (Table I).*

Summary of Laboratory Data of Twenty Acute Cases

Anemia of marked degree was found in three-fourths of the cases, leukopenia (less than 4,000 leukocytes per cubic millimeter of blood) in ten. A positive blood culture was obtained in three cases, whereas in nine others cultures were repeatedly negative; *Streptococcus viridans* was found in two cases and *staphylococcus* in another just prior to death. In fourteen of these cases the roentgenogram was reported negative for

*The home physicians, in three additional cases in which necropsy was not done, notified us that one patient died of Bright's disease with uremia, another died of acute miliary tuberculosis, and the third died of acute mastoiditis followed by nephritis. The remaining seven are also dead, but the immediate cause of death is not known.

TABLE I (CONTINUED). FINDINGS AT NECROPSY IN TEN CASES OF ACUTE DISSEMINATED LUPUS ERYTHEMATOSUS

Case	Age, years and sex	Liver	Kidney	Blood vessels	Brain	Gastro-intestinal tract
1	62 F		Multiple infarcts (right)	Thrombosis left iliac artery and vein; marked arteriosclerosis		
2	16 F		Acute diffuse nephritis			Acute tuberculous enteritis and peritonitis
3	34 M	Moderately enlarged		Arteriosclerosis		
4	58 F			Mild arteriosclerosis	Acute pneumococcal meningitis	Gallstone
5	40 F	Passive congestion	Chronic diffuse nephritis	Mild arteriosclerosis		
6*	22 F	Marked enlargement	Iron pigment present	Slight arteriosclerosis		
7	31 F		Septic infarcts; old pyelitis	Mild arteriosclerosis	Infarcts	Old ulcerative colitis
8	21 F	Fatty changes				
9	19 M		Congenital cysts	Severe purpura hemorrhagica		
10	24 F					Ascites

*Red marrow present in bones.

evidence of pulmonary tuberculosis; in five, arrested tuberculosis was indicated, and in one the report indicated an active pulmonary tuberculosis. Evidence of nephritis was indicated by the presence of casts, albumin, and pus in varying degrees in nine of the cases; in these nine the chemical constituents of the blood were studied, the value for urea varying from 8 to 180 mg. per 100 c.c. of blood. In the case of ascites, tests of hepatic function were reported as showing marked degrees of insufficiency.

Summary of Laboratory Data of Twenty-seven Subacute Cases

In slightly more than half the cases marked anemia was present, while in eleven (41 per cent) leukopenia (less than 4,000 leukocytes per cubic millimeter of blood) was found. Blood cultures were made in five cases in which four were negative while one was reported as containing diphtheroids and nonhemolytic streptococci. In nineteen cases roentgenograms of the thorax were negative for signs of tuberculosis, whereas in one the roentgenograms disclosed healed pul-

monary tuberculosis, and, in another, thickened pleura at the base of the left lung with calcified glands. Varying degrees of nephritis were also demonstrated in this group of cases.

Conclusions

1. In a group of forty-seven cases of disseminated lupus erythematosus, twenty-six were found to have clinical evidence of tuberculosis in one form or another, and in the ten cases which came to necropsy, tuberculosis was demonstrated in five.

2. The outstanding findings in the material from necropsy were tuberculosis, endocarditis, infarcts in the spleen, diffuse nephritis, and terminal bronchopneumonia. Pleural effusion and ascites from passive congestion were noted quite often.

3. Anemia and leukopenia were present in half the cases. Cultures of the blood were positive in four attempts of twenty-four made in fourteen cases. Of the four positive cultures, two were obtained from patients with endocarditis; the third was obtained while the patient was in extremis.

4. Focal infection was noted in forty of the forty-seven cases.

5. The twenty patients with the acute type died on the average of nine months following the dissemination of the disease, whereas eight of the twenty-seven patients with the subacute type died on an average of four and a half years following dissemination. Rogin and I have called attention to the fact that there are seven patients with the subacute type who apparently are cured.

6. Treatment of the subacute type consisted of rest in bed, transfusions of small amounts of blood, administration of quinine, plasmochin and small doses of gold sodium thiosulphate, and roentgen irradiation of the gland-bearing regions of the body.

7. The evidence at hand suggests that disseminated lupus erythematosus is a toxemia in which tuberculosis plays an insignificant part, and that evidence of a specific infectious agent, although suggestive, is still lacking.

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THE TREATMENT OF HEAD INJURIES*

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IN presenting this paper, which has to do with the successful handling of patients who have sustained injuries to their heads, I would like to say, that I believe most patients are satisfactorily treated, a few are overtreated, and a small percentage suffer or even die as a result of faulty diagnosis, faulty judgment, and lack of treatment. The tendency was and is now, although somewhat less so, to overtreat patients who have received such an injury.

At the outset I would like also to emphasize that injury to the brain, and to its coverings, the meninges, the large intracranial sinuses, and to the middle meningeal arteries, is of prime importance, whereas injury to the scalp and to the skull is in itself of minor consequence. So far as I know no one has ever died as a direct result of simple laceration of the scalp or of simple

fracture of the skull; it is only when these injuries are complicated by injury to the brain or to the intracranial vascular channels that serious consequences may result. In order to simplify the subject I have divided cases of head injury into two main groups, minor and major injuries:

Minor Injuries

Under this heading should be included all cases in which a blow on the head has been sustained, in which there has been no loss of consciousness nor evidence of involvement of the central nervous system, and in which roentgenologic examination of the skull for fracture has given negative results. Rarely will a patient with a scalp laceration fall into the second group, which consists of major injuries, because of severe loss of blood due to laceration involving one of the principal arteries of the scalp.

Patients with minor injuries to the head can be satisfactorily treated in the office. If there is

*From the Department of Neurologic Surgery, The Mayo Clinic, Rochester, Minnesota. Read before the meeting of the Wabasha County Medical Society, July 5, 1934, Lake City, Minnesota.

laceration of the scalp, the edges of the wound should be shaved and the wound thoroughly cleansed with tincture of green soap and with hot water. Careful exploration should then be carried out for foreign bodies, especially if laceration is the result of flying glass as from the windshield or window of an automobile. The wound should be swabbed with an antiseptic; I prefer tincture of merthiolate, 1:1,000, or tincture of iodine. The edges of the wound should then be approximated loosely with interrupted sutures of silkworm gut, dermal, or of silk. If it is impossible to control bleeding with tying of the suture, each bleeding vessel must be caught and tied or controlled with a suture ligature lest a hematoma develop beneath the edges of the wound. For the first twenty-four hours a firm compression bandage is advisable. The exploration and suture of the wound is best done under local anesthesia, a 1 per cent solution of procaine being used; among children, gas anesthesia is often advisable and, at times, necessary. If general anesthesia is necessary, hospitalization for a few hours following recovery from the anesthetic of course is advised. If the wound is contaminated with dirt or there is suspicion of soiling, a prophylactic dose of tetanus antitoxin should be given.

Major Injuries

This group comprises all cases in which patients have had a lapse of consciousness, are unconscious or in shock, present symptoms or signs of involvement of the central nervous system, have simple, depressed, or compound fractures of the skull, and those whose head injury is one of a group of injuries sustained during an accident, for today more and more people are encountered with multiple injuries as a result of the mechanization of industry and of speedier methods of travel.

All of these patients should be hospitalized and kept under close observation for at least twenty-four hours, during which time the blood pressure, and pulse and respiration rates should be recorded at frequent intervals. The state of consciousness, mental reactions, and movements of the limbs also should carefully be noted.

Of this group of patients with major injuries a small percentage will be in such poor condition that all measures are likely to be without avail, and death will ensue within the first twenty-

four hours after admission. One should never lose hope, however, for now and then a patient who looks hopeless will respond to conservative treatment and make a nice recovery. Generally speaking, though, a patient who does not give evidence of immediate response to treatment has suffered irreparable injury to the brain, and all attempts, conservative or radical, are of course incapable of restoring such individuals to health.

Most patients with major injuries to the head are in a state of shock, that is, they are unconscious or only partly conscious, the blood pressure is low or imperceptible, the pulse is rapid and feeble, and the skin is cold and clammy. The pupils may be dilated and react poorly to light. When a patient is seen in this condition the indication, of course, is to combat shock. Shock is best overcome by application of external heat in the form of hot water bottles and blankets, avoidance of drafts, lowering of the head and, if hemorrhage from a large vessel of the scalp is contributing to the lowering of blood pressure, immediate control of such hemorrhage. At times, a pressure bandage is sufficient to control bleeding; however, as blood pressure rises, bleeding is likely to start again, so it is well to catch the bleeding vessel with a forceps or pass a suture ligature around it and tie it in order to prevent further loss of blood. If shock is profound, pituitrin (surgical) given hypodermically or even intravenously may be used with great success. This drug acts quickly, but its effect is fleeting. Ephedrine, on the other hand, acts a little more slowly, but its effect is more prolonged. Warm, black coffee, when given by rectum, also is effective in combating shock. Acacia (6 per cent) may be used intravenously to increase the volume of circulating fluids, but if there has been much loss of blood, a transfusion of citrated blood is the best treatment.

Time should not be taken to care for and to suture the wound thoroughly until shock has been controlled.

Pain may be a contributing factor in the production of shock, especially if there is injury to some other part of the body, such as, for instance, rupture of a kidney or fracture of one of the long bones. Sedatives, preferably codeine hypodermically, should then be administered. Morphine should be avoided in cases of injury to the head because of its depressing effect on the nervous system, especially on the respiratory

center; morphine also masks pupillary changes. When morphine has been given, and the patient becomes very quiet and the respirations slow, it is often impossible to tell whether the change in the patient's condition is the result of morphine or whether it indicates the onset of increased intracranial pressure from cerebral edema or from intracranial hemorrhage.

While shock, if present, is being combated, the head should carefully be inspected and palpated for evidence of lacerations of the scalp and for fractures of the skull. The ears, nose, and mouth should be examined for evidence of bleeding that is so often seen with fractures of the base of the skull. Oftentimes one has to rely entirely on the finding of blood in the ear for the diagnosis of a basal fracture, as these fractures are difficult or impossible to demonstrate by ordinary methods of roentgenography.

Inspection and palpation also may reveal a hematoma of the scalp, without laceration, beneath which there may be a linear fracture. Depressed fractures of the vertex are easily diagnosed by palpation alone. As one moves the fingers across the smooth, curved head one may encounter a sharp, firm margin beyond which there is a distinct depression. The depressed bone may be fixed or movable, and rarely is one able to detect bony crepitus as in fractures of other bones of the body.

No one questions the advisability of roentgenologic examination of the head in cases of cranial trauma, but there is a good deal of argument on the part of some as to the time when the patient should be subjected to this examination. At the clinic it is felt that this examination should be made immediately, and all patients with head injuries are sent directly for roentgenologic examination on admission to the hospital. There are many reasons for this practice. The first and most important reason, from both the patient's and the examining physician's standpoint, is that it enables one to tell within a few minutes whether or not there is a depressed fracture; when this is known, future treatment can be outlined intelligently and without undue suspense as to whether or not the patient has an injury which demands immediate, active, surgical intervention; also, it can be determined whether or not there is a linear fracture extending across one of the middle meningeal grooves. The importance of this latter information will be referred to later.

Another very important factor to be considered is the medicolegal aspects of the case. Today, with so many people carrying insurance to protect themselves as well as their automobiles, and the more or less common practice of instituting suit against employers, insurance companies, and others involved in a given accident, it is imperative that the physician protect his patient's interests and his own reputation by having roentgenograms made which can be used in event of litigation. Obviously the best time to have these plates made is at the time the patient is admitted to the hospital. Some patients live only a short time after severe cranial injuries and it might be difficult to obtain roentgenograms.

While the roentgenologic examination is being conducted, the patient may be treated for shock, lacerations may be dressed and even sutured, and a search for other injuries carried out. A superficial neurologic examination also may be performed, in the course of which the size and reaction of the pupils, extra-ocular and facial movements, the power of the extremities, and the presence or absence of pathologic reflexes may be noted.

In the absence of a depressed fracture and of signs indicative of localized injury to the brain, injuries to the scalp should be cared for and the patient put to bed under very close observation. If the patient is conscious and his general condition is satisfactory, ice caps to the head and analgesics, such as acetylsalicylic acid or codeine, in small doses, for headache, may suffice. Fluids should be limited to an intake of 1,500 c.c. for the first twenty-four hours and they should be in the form of fruit juices and sweetened drinks. This is to limit reactionary edema and swelling in the brain.

If the patient is not doing well, and irrespective of whether roentgenologic examination has demonstrated a fracture of the skull, a diagnostic and therapeutic lumbar puncture may cautiously be performed. Lumbar puncture should not be done in the presence of compound fracture of the vault or of the base because of the danger of the introduction of bacteria when the current of cerebrospinal fluid is started down the spinal canal after fluid has been escaping through a rent in the meninges and skull. Patients with compound fractures decompress themselves or lower their own intracranial pressure, and lumbar puncture

ture is, therefore, unnecessary as a diagnostic or therapeutic measure.

Some very excellent neurosurgeons advise against the use of lumbar puncture in cases of cranial injury, but I believe it is one of the greatest aids in selected cases and, when cautiously used, free of danger. I am confident that many lives have been saved and that many patients have been spared major complications as a result of wisely conducted spinal drainage. Spinal drainage and intravenous injection of hypertonic (20 to 50 per cent) glucose solutions are our mainstays in the control of increased intracranial pressure resulting from injury to the brain, and these measures have lowered the incidence of the necessity for operative intervention and the mortality rate in cases of cranial injury. Today it is rarely necessary to perform subtemporal decompression in cases of pure cerebral edema resulting from trauma.

Operative intervention, therefore, is indicated only in cases of depressed fracture and in cases in which signs of localized pressure or irritation are exhibited as determined by neurologic examination. The time interval which elapses between cranial injury and the appearance of symptoms and signs of compression of the brain is very important in the differential diagnosis of the cause of compression. Depressed fractures produce symptoms immediately, whereas hemorrhage requires a few hours in which to produce a clot large enough to give signs of a space-occupying lesion. If symptoms do not appear for a day or two, the most likely cause is edema of the brain from contusion caused by jolting of the brain in the rigid cranium.

In cases of depressed fracture, the fragment or fragments should be elevated and replaced, if the fracture is not compound; if the fracture is compound, it is probably better to remove the fragments because of the danger of infection and of development of an osteomyelitis that would necessitate later sequestrectomy.

In extradural hemorrhage, originating from a tear in one of the middle meningeal arteries, there usually is a definite triad of developments. The patient is momentarily unconscious from a blow on the head; this is followed by a lucid interval which is supplanted several hours later by a state of unconsciousness and stupor. This history, together with a roentgenogram revealing a fracture extending across one of the middle

meningeal grooves, enables one to make a diagnosis of extradural hematoma of middle meningeal origin. It has been taught that, in subarachnoid hemorrhage or bleeding from cortical vessels, the cerebrospinal fluid is bloody, and that, in extradural or middle meningeal hemorrhage, the fluid is clear. That is true as far as it goes; one may, however, find bloody spinal fluid from tearing of a middle meningeal artery and, of course, the two conditions may co-exist. Recently, at the operating table, I was able to demonstrate the passage of blood from a torn, middle meningeal artery into the subarachnoid space and the passage of clear fluid from the subarachnoid space into the trephine opening. This patient's spinal fluid had been bloody on lumbar puncture. He made an excellent recovery following ligation of the torn, middle meningeal artery and removal of a large extradural hematoma.

If, in the absence of evidence of a break in the continuity of the skull, the patient has convulsions involving one extremity or one side of the body, or if he has definite weakness of a member, the opposite side of the brain should be explored for a progressively enlarging, intradural hemorrhage. Preliminary lumbar puncture will reveal bloody fluid under increased pressure.

In cases in which there is leakage of cerebrospinal fluid or in which a fistula develops as a result of a basal fracture extending into the paranasal sinuses, the pharynx or ear, treatment should be conservative. Active intervention in the way of operative procedure is likely to result in meningitis, with a prolonged and complicated convalescence, or even in death. Spinal puncture should not be done for the reasons mentioned before. Instead, the patient should be propped up in bed and methenamine (urotropine) administered so long as the fistula remains patent. The position is important because it allows the brain and its surrounding membranes to settle down against the line of fracture and seal it off, purely as the result of gravity. Methenamine acts as a meningitic antiseptic. When there is leakage of cerebrospinal fluid as a result of basal fracture, the patient should be warned not to blow his nose because of the danger of ascending infection and of meningitis. In cases in which cerebrospinal fluid leaks through the ear, special attention should be paid to the ear or ears involved. The ear should not be irrigated or tightly plugged;

instead, a small pledget of sterile cotton, wrung out of a saturated solution of boric acid, should be left in the external auditory meatus. This should be changed as often as necessary to insure complete absorption of all fluid discharged through the rent in the meninges.

Patients who have sustained severe cranial injury should be kept under observation for some time after they apparently have completely recovered, and they should be warned concerning the possibility of development of post-traumatic sequelæ. Such sequelæ are prone to develop in compensation cases, and it is at times a most difficult problem to decide whether a given patient has real trouble or whether in his desire for a satisfactory settlement of his claim he consciously or subconsciously magnifies his symptoms. However, as soon as the patient is able, graduated exercises should be started, his claim settled, and he should be urged to return to work.

The most common sequelæ to injuries of the head are headache and dizziness, both of which are subjective phenomena that cannot accurately be estimated. Headache in many cases is undoubtedly real and is due to faulty absorption of cerebrospinal fluid, which results in chronic hydrocephalus and in increased intracranial pressure. This condition can be ameliorated by limitation of fluid intake and by careful attention to the bowels, using laxatives, if necessary, to secure daily movements. Occasionally, repeated spinal drainages are necessary until the absorptive mechanism catches up with the secreting mechanism. Dizziness at times is quite troublesome to the patient and a major problem to the physician; it may result from a fracture that has involved the ear and semicircular canals, or it may be a sequel to petechial hemorrhages in the

cerebellum. Reassurance, regulation of habits, and a mild sedative, such as one of the many preparations of bromides or of phenobarbital (luminal), often help. Occasionally dizziness is so disabling as to warrant, in selected cases, intracranial section of the eighth (auditory) nerve.

Epilepsy is an unfortunate complication that may arise in any case and one whose occurrence is impossible to forecast. If this complication does appear, and seizures are mild and infrequent, they may be controlled by regulation of the patient's habits and by administration of a saline cathartic when a seizure is anticipated. Some patients require bromides or phenobarbital, either alone or alternately, for indefinite periods. Operation in post-traumatic epilepsy is not indicated unless a foreign body is present or the seizures are Jacksonian in type; even then results are not always brilliant.

Not infrequently patients are seen at the clinic who give a history of cranial trauma, which at the time of the accident was considered quite mild, who have never recovered completely, even though several weeks or even a few months have passed. In such cases the condition may be due to cerebral compression from chronic, subdural hematoma or from a collection of blood between the dura mater and arachnoid. If neurologic investigation reveals signs of increased intracranial pressure, exploration should be carried out. Evacuation of these accumulations of blood gives very good results.

In conclusion, I wish to state that each case of head injury is in itself an individual problem and should be so managed. When these patients are studied carefully, closely observed, and treated according to the indications in the particular case, the results are very gratifying. Treatment should be as conservative as possible.

CARBARSONE

p-Carbamido-phenylarsonic acid, containing from 28.1 to 28.8 per cent of arsenic (As).—Carbarson is proposed for the treatment of intestinal amebiasis. It is administered usually by mouth; in acute amebic dysentery or in resistant cases, retention enemas may be employed. While carbarson is said to be less toxic than acetarsone and serious untoward effects appear to be uncommon, cutaneous disturbances and other reactions common to arsenic compounds have been observed. While visual disturbances appear to be quite rare, the possibility of their occurrence should be kept in mind. Excretion of the arsenic is relatively slow; suitable rest periods must therefore be interposed in the treatment to prevent cumulative effects. In view

of the frequency of persistent infection in the absence of marked symptoms, adequate therapy includes re-examinations and repetitions of courses of treatment. The usual oral dosage for adults is 0.25 Gm. twice a day for ten days. As retention enemas, for adults, 2 Gm. dissolved in 200 c.c. of warm 2 per cent sodium bicarbonate solution may be administered following a cleansing alkaline enema every other night for a maximum of five doses, if necessary. Because of the large dosage employed, oral administration should be interrupted during this interval. Carbarson is supplied in vials containing 2 Gm. and in pulvules (capsules) containing 0.25 Gm. The name is trademarked but the firm disclaims proprietary rights. Eli Lilly & Company, Indianapolis. (Jour. A. M. A., July 28, 1934, p. 259.)

THE VISUAL EXAMINATION OF THE URINE*

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EXAMINATION of the urine may yield information of the utmost value. Often unexplained fever or vague pain in the back is on a urologic basis. These matters are well known, but the value of visual examination of urine, macroscopic and microscopic, seems not to be fully appreciated. I believe it should be carried out in general practice, not only in urologic practice, on every patient.

When a patient comes to the office, whether infection of the urinary tract is suspected or not, the first laboratory procedure should be visual examination of the urine. It must be assured that a fresh specimen of uncontaminated urine is obtained. If the patient is a male, the glans penis and prepuce first should be washed with soap and water, and then, with the prepuce retracted, the glans should be cleansed further, with a sponge soaked in an antiseptic solution. Without contaminating these cleansed parts, the patient should then be instructed to pass at least 2 ounces, 60 c.c. of urine, into a first glass and the remainder into a second glass. These glasses should be clean but they do not have to be sterile. While the urine is being passed into the second glass, urination should be interrupted, and about 10 c.c. collected in a sterile test tube fitted with a sterile cotton plug. The mouth of the tube should be flamed before and after the urine is passed into it. This specimen may be sent to the laboratory for culture if further examination of the urine makes clear the necessity of this. For convenience, the first glass is marked G 1 and the second glass is marked G 2. The first glass is always placed to the left of the second one as a further check as to the identity of the two glasses, for, as will be seen later, the findings in each specimen are of great importance.

In a good light the two specimens are inspected. Whether the urine is clear, hazy, cloudy, bloody, or shreddy is noted. Clear urine emphatically does not in itself rule out the presence of microscopic pyuria or bacteriuria. Ac-

cording to many investigators, the first glass will contain the washings of the urethra and the second glass will contain the true washings from the bladder and whatever might seep through from the posterior urethra into the bladder. A sample from the second glass is centrifuged, and the sediment is recovered. A drop of it is placed on a clean glass slide, is covered by an ordinary thin cover-slip, and is examined under the high dry power of the microscope. The various crystalline elements, erythrocytes and leukocytes, spermatozoa, mucous shreds, and occasionally bacteria, are clearly visible if present. A count should be made of the erythrocytes and leukocytes per high power field. Occasionally urine may be grossly cloudy because of the presence of earthy phosphates, but this can be quickly determined by taking a small sample of the urine and adding to it a few cubic centimeters of acetic acid. If the cloudiness is due to the presence of these phosphate crystals it will rapidly disappear. It is important that this procedure be carried out on a separate sample, for the addition of acetic acid to the whole specimen will bring about hemolysis of the erythrocytes, if present, and mask the true picture of the urinary sediment.

As I have stated, the first glass contains the washings of the urethra, whereas the second glass contains the true vesical urine. Keyes has cautioned against two exceptions to this statement:

1. Insoluble substances, such as crystals, pus, and blood clots may settle to the floor of the bladder and be dislodged only at the end of urination.

2. The urethra may contribute to the second glass by the contraction of the bulb at the end of urination, which would express pus from the prostatic ducts, or blood from an inflamed vesical neck.

Probably the best and most complete summary of findings and indications as denoted by the two glass test is a table compiled by Pelouze. Because of the completeness of this table I should like to present it in full (Table I).

*From the Section on Urology, The Mayo Clinic, Rochester, Minnesota.

TABLE I. SUMMARY OF THE TWO GLASS TEST (PELOUZE)

First glass	Second glass	Impression
Cloudy	Clear	(a) Acute anterior urethritis. (b) Acute anterior urethritis with mild or subsiding posterior involvement.
Hazy	Clear	(a) Mild acute or subacute anterior urethritis. (b) Mild acute or subacute anterior urethritis with mild posterior involvement.
Shreds	Clear	(a) Subsiding anterior urethritis. (b) Subsiding anteroposterior urethritis. (c) Chronic urethritis, generally as the result of deeper foci of infection in the prostate or other associated small channels.
Cloudy	Cloudy	(a) Acute anteroposterior urethritis. (b) Cystitis or upper tract suppuration.
Cloudy	Hazy	(a) Subacute or mild anteroposterior urethritis.
Hazy	Hazy	(a) Subacute or mild anteroposterior urethritis. (b) Bacteriuria.
Clear	Cloudy	(a) Seminal fluid. (b) Contents of pus pocket. (c) Sedimented mucus, or phosphates from a poorly emptying bladder. (d) Slight terminal bleeding.

From the female patient the specimen should be collected by means of a sterile catheter, after the labia, external meatus, and surrounding parts have been thoroughly cleansed with soap and water and then sponged with alcohol. In introducing the catheter, which may be a soft, flexible number 12 French instrument, or a glass catheter of the same size thoroughly lubricated with sterile jelly, the labia are held apart to prevent contamination of the catheter before its introduction into the urethra. About 10 c.c. of the catheterized urine should be collected in a sterile test tube for culture, if desired, and the remainder put in a clean glass. This latter specimen should then be examined macroscopically as was the second glass of the male patient's urine, and the same gross characteristics noted. Following this, a sample of the urine should be centrifuged and a drop of the sediment recovered. This is placed on a clean glass slide, covered by an ordinary thin cover-slip, and examined as has been explained.

The difference in the gross and microscopic appearance of voided and of catheterized urine from the female is often striking. In a voided specimen, the vaginal and cervical secretions are present, and these may and frequently do entirely obscure the true picture. At the time of menstruation the voided specimen contains gross blood and this is misleading. Unless the sedimentary findings on a voided specimen from a

female are entirely negative, microscopic urinalysis is of no value whatever.

From here on examination of the second glass of urine from the male and of urine from the female are the same. Following careful analysis of the urinary sediment under the high, dry power of the microscope, the cover-slip is removed, and the remaining secretion evenly smeared over the entire slide. The slide is then dried and fixed by passing it rapidly through a flame a few times. Sometimes a more satisfactory slide can be made by decanting off the supernatant urine from the centrifuge tube, refilling the tube with water, and shaking in order to wash the sediment thoroughly, and finally centrifuging again. Of all the stains which have been suggested for urinary sediment, the gram stain is probably the most useful. This stain has been greatly modified by many writers, but a reliable modification of the original method of using the gram stain is probably the following one, in which four different solutions are used. These solutions are given in Table II and should be made up with distilled water to insure their stability.

TABLE II. SOLUTIONS FOR GRAM STAIN

1. 1 per cent methyl violet 6 B in water.
2. Iodine 2 gm., 10 c.c. normal sodium hydroxide and 90 c.c. water.
3. Acetone.
4. 0.1 per cent basic fuchsin in water.

Each of these solutions should be applied to the dried and fixed smear in the order named, and in between the application of each two solutions, the slide should be washed with water. It is necessary to leave each of these solutions on the slide only a few seconds to ensure a satisfactory stain. The slide containing the stained smear is then examined under the oil immersion lens. This examination roughly divides the organisms, if present, into four groups, which are: the rods which do or which do not retain the stain; and the coccal forms which do or which do not retain the stain. Those which retain the stain (gram positive) are colored a deep blue. Those which give up the stain on the addition of the acetone and then stain with the counter stain, basic fuchsin (gram negative) are colored a rather bright red. It is recognition of the presence of these organisms which is of prime importance. Often, during the remission between recurrent attacks of infection of the urinary tract, the urine will contain only an occasional pus cell and will be clear macroscopically. Nevertheless, careful examination of the stained smear will, in the majority of cases, reveal organisms.

For actual identification of the organisms, a complete bacteriologic study is necessary and in this cultural methods must be used. The most common invader of the bacillary group is *Escherichia coli*, and less frequently *Aerobacter aerogenes*, or organisms of the genus *Proteus*, genus *Pseudomonas*, genus *Alcaligenes*, genus *Salmonella*, and genus *Shigella*. Of the cocci, a green-producing streptococcus and the *Streptococcus faecalis* are the commonest, and organisms of the genus *Micrococcus*, of the genus *Staphylococcus* and hemolytic streptococci are less often found.

The material presented here is certainly not new to the medical profession but if it was to be

given the place in practice which it deserves it would be new. Examination of the stained smear is important from diagnostic, prognostic, and therapeutic points of view. It enables one to determine whether or not an infecting organism is present, and it also allows a rough grouping as to the type of organism. The information gained from this diagnostic procedure is of great importance in outlining the immediate course of treatment. Such microscopic studies are so simple that they can be made in a few minutes and they are best carried out by the examining physician himself. He should perform this examination in his own laboratory, for these findings are important not only from a diagnostic point of view but also in determining the daily progress of the patient. Particularly in urinary infections caused by any of the cocci, examination of the stained smear may be the only means of determining the presence of the offending organism; many cocci are exceptionally hard to culture.

This simple visual examination may forestall more strenuous attempts to arrive at the exact diagnosis and to rule out underlying pathology. If a physician rushes in with repeated catheterization, cystoscopy, and pyelography, the acute or subacute attack may be greatly prolonged. These last named procedures have the most important place of all and should always be carried out eventually if there is any reason to suspect a complicating lesion. This place, however, is after the acute condition has subsided and the infection is under control.

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HEMP MASSAGER NOT ACCEPTABLE

The Council on Physical Therapy reports that the Hemp Massager, manufactured by the Conley Company, Inc., Rochester, Minn., consists of two rubber balls mounted on spindles at right angles to each other. As this device is pulled along over the body, the rubber balls pinch the skin and by friction lift it and underlying superficial tissues above the contour of the body or limbs. The Council investigated this massager and declared that it did exactly what, in practicing good massage, a masseur tries to avoid; it pinches the superficial tissues instead of picking up and kneading deep tissues as well as the superficial. Even if the massager

faithfully duplicated hand massage there are certain statements in the advertising for which critical evidence is not available. The Council objected to the claims made for the relief of headache, nervousness and constipation. In reality, these conditions might be caused by some impaired function other than that for which massage is justly indicated. The Council regards the advertising as objectionable, because satisfactory evidence is not in its possession to substantiate the efficacy of massage with this unit in the conditions mentioned. It has declared the Hemp Massager ineligible for inclusion in its list of accepted devices. (*Jour. A. M. A.*, February 10, 1934, p. 455.)

THE PATHOGENESIS AND TREATMENT OF OBESITY*

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THE human body is a machine that utilizes, transforms, and stores energy according to natural laws. Fat represents energy stored. Therefore obesity indicates that the equilibrium between the energy intake and the energy output (calories taken in in the form of food and the calories produced in the form of heat) is disturbed, the intake being greater than the output.

The problem in the study of the genesis of obesity resolves itself into the question as to what disturbed mechanism causes the excessive intake of food. This subject offers many difficulties, principally because the metabolic deviation from normal is so slight that our present methods are not sufficiently fine to detect the cause. Noorden has shown that an excess of 200 calories daily over a period of one year is capable of increasing the body weight fourteen pounds.

Most of the early work in obesity was directed toward the possibility that the obese person is able in some manner or other of expending energy in an economical way, that he reacts to various physiological stimuli with a lowered caloric output. However, studies of the basal metabolic rate, the specific dynamic action of food, and the reaction known as *luxus consumption* have shown that only an occasional case can be ascribed to such a cause. Wang, Strouse and Saunders¹² showed in six cases of obesity what they considered a failure to react in a normal manner to the ingestion of protein. Lauter,⁶ on the other hand, believes that the reaction normally is variable and that the obese rarely show an absence of the rise in the metabolic rate. In order to ascribe the origin of obesity to such a cause he believes that a complete failure to react must be demonstrated.

The endocrine glands have long been held responsible for a large percentage of the cases of adiposity and undoubtedly hypofunction of the gonads, thyroid and pituitary and hyperfunction of the adrenal cortex do produce obesity, but it is quite certain that the number of cases result-

ing from such a cause is very small. The diagnosis of such an origin rests on the finding or other signs indicating an endocrine disturbance.

If only a relatively few cases of obesity can be explained by a decrease in energy output or by an endocrine abnormality, what explanation can be advanced as to the pathogenesis of the remaining large group estimated as being over 90 per cent. The direction of the present-day investigations has changed from a consideration of the total energy expenditure in obesity to the study of the fatty tissue itself, assuming that adipose tissue is a living active tissue subject to disturbances in growth and metabolism and like other cells affected by chromosomal or genetic influences.

This conception of constitutional obesity has both its champions and opponents. Bauer¹ and Von Bergman have been its chief supporters for many years. Recent investigations in man and animals have produced evidence that lends a more solid basis for such an etiology.

Constitutional obesity implies that there is in the chromosomal makeup factors that determine the rate of growth of fatty tissues, just as chromosomal factors determine the growth of long bones, the length of the nose and the color of the hair. It is assumed, and not without some evidence, that the fatty tissue in the obese possesses the inherent impulse to grow to a marked degree. Such an abnormally high growth-rate demands a greater energy intake just as a growing child requires more calories per square meter of body surface than does the adult. The demand for more energy (food) is evidenced by an increased appetite. The food taken in supplies more calories than that which is produced in the body and is stored with fat depots.

What evidence have we to support the conception of a constitutional origin for most of the cases of obesity? It is a common experience in taking histories of obese patients, to find that in a large number of instances one or more members of the family are also obese. That this is not due to a custom of living is shown by the fact that in the same family and under the same con-

*Presented before the Ramsey County Medical Society, February, 1934.

ditions there will be both lean and fat individuals. Danforth² bred a strain of white rats that were very obese, and showed that the obesity was transmitted as a Mendelian characteristic. Students of heredity have shown that when both parents possess unfavorable dominant characteristics the offspring of these parents may not be capable of surviving. This condition has been observed several times in offspring of very obese parents.

Von Bergman and his pupils, notably Kugelman,⁵ have shown that there is a disturbance of the intermediary metabolism in these cases. The results of their investigations indicate that the fatty tissue of the constitutionally obese possesses to a marked degree the ability to take up carbohydrates from the blood stream and transform it into fat. They found the liver and the muscle to be relatively poor in glycogen, indicating that the storage of this substance was prevented by the rapid extraction of carbohydrate from the blood stream by fat cells.

That fat tissue possesses autochthonous growth characteristics is well shown in its transplantation reactions. When a section of skin with underlying fat from a fatty area is transplanted to a lean area the fat persists and in periods of overnutrition the fat is accumulated more rapidly in this transplanted area than in the surrounding lean region.

This type of obesity varies greatly, both in its degree and in its distribution. It may be present as small localized accumulations such as lipomas or it may be confined to areas of the body as around the hips or breast. More often it is a diffuse development of adipose tissue spread all over the body. The fat men and women of the circus side shows represent an extreme degree of this condition.

The idea that these cases must be linked with some endocrine disturbance has exerted a hypnotic influence over the medical profession. This is due primarily to general lack of information regarding endocrinology and to the magic and mystery that seems to surround this subject. There is no good evidence to indicate that in these obesity cases the endocrine secretions play any part whatever. Autopsy studies have failed to show either microscopically or macroscopically any changes in the ductless glands with the exception of the work of Kraus, who found an increase in the number of basophilic cells in the anterior pituitary.

Hormones act either as stimulators or inhibitors of developmental processes. The degree of growth is determined primarily by genetic influences. For example, castration in the young will produce gigantism only if the autochthonous impulse of the long bones to grow is present in a marked degree. If this impulse is not present the castrate will not develop unusually large proportions. The gonadal secretion acts to inhibit the growth of long bones but does not determine the ultimate length of the bones. Similarly the castrate may become obese, that is, fat will accumulate around the hips, above the pubis and in the breast region, a typical female distribution. The male gonads, then, inhibit the fat deposits in this region. However, if the genetic impulse of the fat to grow is absent, he will not become obese. Certain glandular disturbances at times lead to obesity and at other times the obesity is absent. It seems that in order for these people to become fat there must be present a constitutional predisposition to obesity.

Along with the lipophilic tendency in these people there is also present a hydrophilic tendency of the fatty tissue, which permits it to act as a sponge, capable of holding, and at times tenaciously, considerable amounts of water. The amount of retained fluid has been variously estimated as being 5 to 70 per cent. This edema is independent of any circulatory or renal disturbance and is a peculiarity of the tissue itself. Graefe has estimated that if the dry fat in the body weighs 30 kilograms, with a 5 per cent addition of fluid the moist fat would weigh 31.5 kg.; and with an addition of 70 per cent water, 51 kg. It is doubtful whether this extreme hydrophilic tendency is present in many cases. The sponge-like water absorption of the fatty tissue must always be kept in mind, especially when interpreting the results of therapy. Recht¹⁰ and others have shown that the absorption time of fluid injected under the skin in fatty areas is greatly shortened. He also found that there was a marked difference in the absorption of fluid from fat and thin areas in the same person. Dell'Acqua³ has demonstrated a definite retention of sodium chloride in the fatty tissues. Newbrough's^{7, 8} experiments in undernutritional diets have shown that the failure to lose weight is due to water retention.

There is no characteristic distribution of the fat in the constitutional type of obesity and the diagnosis is made mainly upon the family his-

tory. The difficulty often encountered is in those individuals showing constitutional obesity and also other constitutional variations from normal such as bone growth and hair distribution. One frequently meets instances of obesity in the male with a female type of pubic hair growth and with no other signs of gonadal insufficiency. These people are not obese because of testicular insufficiency. In the female one meets marked obesity and amenorrhea. The amenorrhea often disappears after reduction in the excess fat takes place. The menstrual failure is not the cause of obesity but a concomitant manifestation of ovarian insufficiency. If the ovarian insufficiency is relieved by other measures than the diet there is no change in the obese state. All these things merely express a well known fact that chromosomal variations are often multiple, just as congenital heart disease is frequently accompanied by some abnormality of the fingers and toes.

The claim has been made that a normal individual possesses a regulatory mechanism that prevents him from developing obesity and that this mechanism is under the control of an appetite center in the brain. In support of this have been offered the cases of obesity developing after lesions in the forebrain, and especially in the region of the third ventricle, and the tuber cinereum. However, one frequently encounters obese individuals having no hereditary history, no internal glandular disturbances, and no evidence of a brain lesion. These cases can best be explained on the basis of changes in the habits of eating or living.

Habits of eating play a large rôle both in obesity cases and under-nutrition. This fact has been repeatedly demonstrated in those undergoing obesity cures and in attempting to gain weight. One frequently observes in athletes a tendency to obesity following the termination of active participation in athletics. The best explanation of this change is that during the active period habits of eating were formed, and later with a diminished energy output the intake remained the same. When one considers that it requires only a small daily caloric intake in excess of that required to cause an appreciable gain in weight in one year, it is not surprising that slight changes in habits can lead to obesity. If it requires only 200 calories a day in excess to produce moderate obesity, this can result from a daily extra slice of bread and butter, a dish of ice cream, or a piece of pie.

Changes in activity that reduce the caloric expenditure 200 to 300 calories a day may lead to excessive fat deposits if the diet remains the same. This can easily occur when one moves close to a car line or when one no longer has to climb steps, or when light exercise is abandoned. In other words, habits of eating are formed under certain conditions which maintain a proper balance between the energy intake and the energy output. When these conditions are changed without a change in diet the balance is disturbed.

Treatment

Obesity often results in serious consequences. Its effect on the circulatory system by increasing the size of the circulatory bed and through its interference with the movements of the diaphragm is well known. That it is injurious to the respiratory mechanism and the digestive tract has repeatedly been pointed out. The seriousness of the conditions should be emphasized to those possessing this constitutional defect. They should early be taught habits of eating and exercise, for as Graefe has stated: "It is much easier not to get fat than it is to lose excessive fat."

In spite of the constitutional origin of most cases of obesity, the treatment is not without effect, but because of the nature of this origin it must be carried out throughout the life of the patient. Any treatment designed to cause a sudden loss of weight without regard to the future is worthless, because with the cessation of the treatment the fat again piles up. For that reason extremely low caloric diets of 400 to 500 calories are only of scientific interest except in rare instances.

As therapeutic measures we have at our disposal diet and exercise, organotherapy, diuretics, and a few other non-endocrine substances.

Of these measures by far the most important is diet. No other treatment in itself is of sufficient therapeutic value. No pill, salt, or injection will produce a lasting loss of weight. Lack of space will permit only a résumé of the essentials of such a diet.

The diet should be of such a nature as to be deficient in calories so that it will permit a reduction in weight but at the same time it must have a composition that will provide variety and allow the patient to carry on his daily activities. A very low caloric diet will produce a quick loss of weight but the patient will rarely follow it

long enough to have it do much good. For most cases a loss of two pounds a week is sufficient. Such a reduction can usually be accomplished by a diet of 1,000 to 1,200 calories. Diets containing 400 to 500 calories, such as recommended by Evans and Strang¹¹ are not to be recommended except in unusual cases. The composition of the diet can be varied greatly as long as the calories are kept low. The protein content should be of good quality (meat, eggs, etc.), to an amount of about 100 grams. A high protein diet is of value because of its specific dynamic action which results in a loss of calories. The fats especially should be kept low as its high caloric value robs the diet of bulk which is necessary to prevent constipation. It can rarely be reduced below 40 grams as a diet very low in fat is not palatable. The remainder of the calories are to be made up of carbohydrates.

Endocrine Therapy

The layman and even many physicians feel that if only the right combination of endocrine substances could be obtained, their difficulties would vanish. As a matter of fact the only endocrine preparation that is of value is that of thyroid. Theoretically pituitrin should be effective, as Raab⁹ has shown a definite mobilization of fat from the fat depots toward the liver after an injection. When pituitrin was injected into the ventricles it was more effective than when it was injected intravenously. From a practical standpoint this observation is of little value. Anterior pituitary lobe preparations or whole gland substances are without value. Ovarian hormones are also valueless in the treatment of obesity in the female.

Thyroid substances are specific in the treatment of obesity accompanying hypothyroidism and are often of great value in obesity from other causes. Its effectiveness lies in its ability to stimulate the metabolic rate and in its diuretic action. Its dangers should be recognized, but when it is indicated the dosage should be large enough to secure an effect. Very small doses, such as have been advised by some, appear to be worthless.

When is thyroid to be used? In general one may say that as long as satisfactory loss of weight is secured by diet and exercise no medication is indicated. Some advise its use coincident with diet. It is of special value during the period of the cure when the weight loss has remained

stationary. One often finds that the patient loses weight satisfactorily on diet for three weeks to a month and then reaches a period when no further loss takes place. This is due to a retention of fluid and probably also to a reduction of the metabolic rate following the low diet. This is a good time to use thyroid, giving 10 grains of the desiccated gland a day for four or five days.

In an adult there is little use in giving less than 6 grains a day. At the end of a week or ten days, if no effect is noticed the dosage can be raised. If signs of thyroid intoxication are present the treatment can be stopped or the dosage reduced. Individuals vary greatly in their reaction to this medication. Unpleasant symptoms, such as tremor, sweating, tachycardia, and weakness may occur, but will disappear on withdrawal of the drug.

Treatment with Non-Endocrine Preparations

If the conception of the constitutional origin of obesity is true, then the desirable remedy would be one that would reduce the anabolic activity of the fatty cells. To date no such remedy has been discovered. Next to be desired is something that will cause a reduction of appetite. Of the several preparations that have been advanced, none has been particularly successful.

Recently dinitrophenal has been shown to have a very definite action in increasing tissue oxidation. The early reports were very encouraging, leading us to believe that its use was without danger. Since that time a fairly large literature has grown around the subject, pointing out the fact that it is capable of producing serious reactions and even death. Along with the more severe untoward effects there also occur numerous unfavorable reactions which, although not serious, often make the patient uncomfortable.

In a group of fourteen patients followed by the author, two developed urticaria. One of these cases presented giant eruptions covering a large part of the body, with marked swelling of the face, hands and feet. This patient was very uncomfortable for five days. The other case of urticaria was considerably milder and lasted three days. Another case developed a dryness of the skin over the hands and fingers, with a subsequent exfoliation. A fourth case lost the sense of taste so completely that he could take a tablespoon of salt in his mouth without being able to recognize it. Several of the other patients com-

plained of fatigue of varying degree, and one found the sensation of heat very uncomfortable.

All of these patients received the same dose—gr. $1\frac{1}{2}$ a day for one week, gr. 3 during the second week, and gr. $4\frac{1}{2}$ at the beginning of the third week. No case was given more than $4\frac{1}{2}$ gr. a day. Basal metabolic rate determinations were made about once a week for four to five weeks. At the end of the third week the basal rate varied from plus 25 per cent to plus 40 per cent and as far as could be determined from the metabolic rate, the drug did not produce a cumulative effect.

Although none of the above untoward reactions were serious, they should be a warning against the promiscuous prescribing of this preparation. A dose of four and a half grains a day with a suitable diet (1,000 to 1,200 cal.) was sufficient to cause an average loss of weight of two pounds a week in all the patients. A larger dose seems to be unnecessary.

The only other non-endocrine products that are of real value are the diuretics. Many of the so-called failures of obesity cures are due not to the failure to lose fat but to the accumulation of fluid in the fatty tissues. This water is often difficult to eliminate and requires diuretics to force it out. The preparations that are effective in cardiac edema are also valuable in this condition. Diuretics such as theophyllin, diuretin, and aminophyllin are rarely effective. Ammonium nitrate and salyrgan can be used to the greatest of advantage.

There is no single plan that one can recommend as to the dosage and frequency with which these preparations should be used. When the ordinary dietetic measures fail, ammonium nitrate can be given in doses of two grams three times a day for a few days. If no diuresis results 1 c.c. of salyrgan can be given intravenously. On account of the obesity it is often difficult to locate a vein and if the injection occurs outside of the vein a slough may result. Intramuscular injections are also often accompanied by sloughs that heal with difficulty. Often one injection is sufficient; at times two to three are necessary at four to five day intervals. Obviously cases complicated with kidney and bowel dis-

turbances are not suitable for this treatment.

Foreign protein, especially milk injections, have been used with the claim that it is an effective treatment. When used alone it is of no value, but in combination with thyroid it at times has some effect. The results are so uncertain that its use is not recommended.

Last, but not least, in our cure is exercise. The obesity makes physical activity a considerable effort and for that reason a vicious circle is instituted. A strenuous effort must be made to increase the caloric output through exertion. The disinclination to exercise often prompts these people to seek aid from the masseur, or by recourse to rolling machines. Such measures are of very small value.

In starting our cure we must realize and must impress upon the patient the necessity of forming new habits of eating and living and that all other measures are merely aids. There is no royal road to thinness for these people.

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CASE REPORT

SELF-INFLICTED LESIONS OF THE SKIN AND MUCOUS MEMBRANE*

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and

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A good deal of confusion still exists in regard to the recognition and interpretation of self-inflicted lesions of the skin. The cause of such lesions may be overlooked for a long time by the first physician in attendance because he is biased through acquaintance with the patient or relatives, or is so close to the situation as to be unable to view it in proper perspective. Aside from malingerers, these patients are usually young women, with a background of hysteria, who seek to attain some definite end by their misconduct: either sympathy or escape from unpleasant duties or environment. Even though the true state of affairs be surmised, unless the motive is analyzed and the situation readjusted, there is little prospect of cure.

From a dermatologic standpoint these cases may be recognized by the unusual sequence of events, the bizarre character and distribution of the cutaneous lesions themselves, and the failure of the ensemble to conform to the characteristics of the infectious granulomas or the noninflammatory cutaneous disorders. A case is being presented in detail here because it well illustrates several points of interest in the analysis and solution of unusual problems of this sort, and also because it presents the condition, which we believe to be rare in such cases, of involvement of the mucous membranes.

Report of Case

*An unmarried woman, aged forty-eight years, registered at the clinic December 26, 1933, complaining of ulcers of the throat, abdomen, and legs, and of numbness and tingling of the extremities. She also had had some recent abdominal distress, nausea, and occasional diarrhea. The family history and past history were essentially negative, save that two years before both parents had died.

In July, 1932, she had noticed numbness and tingling of the fingers and hands, and then of the feet. This had persisted, and gradually had increased, so that she had had difficulty in carrying out her ordinary household duties. In November of the same year she had noticed an ulcer on one foot and then on the other; later, others had appeared on the hips and elbows. These ulcers had healed slowly over a period of weeks to months, and new lesions had appeared from time to time. The ulcers which were present on the abdomen and ankles on admission first had appeared in August, 1933. In March, 1933, during an epidemic of sore

throat in the vicinity, the patient's throat had become inflamed, and the ulceration present had persisted practically unchanged. Various diagnoses, made in the past, had included lead poisoning, possible syphilis, tuberculosis, and Vincent's angina, and treatment had included intravenous injection of neoarsphenamine, sodium thiosulphate and gold sodium thiosulphate. Also, numerous chemicals had been applied to the ulcers.

The patient was of the thin, asthenic type and weighed only 92 pounds (41.7 kg.). A year and a half previously she had weighed 135 pounds (61.2 kg.). The blood pressure was 100 mm. of mercury systolic and 40 diastolic. The heart and lungs were essentially normal. There were no abdominal masses or tenderness. Examination of the pelvis also revealed nothing abnormal. There were eight ulcers on the right foot and ankle, four on the left (Fig. 1), and two on the abdomen (Fig. 2). They were round to oval, rather sharply circumscribed, and varied in diameter from about 1.5 cm. to, perhaps, 12 cm., and were covered with a firmly adherent, heavy, dark, sphacelus. All the lesions were markedly destructive; those on the ankles were abruptly demarcated from a background of normal skin, without infiltration; those on the abdomen were larger, with excoriations and smudges of erythema at the borders, extending peripherally, in irregular, finger-like processes. On the extensor surface of the right elbow there was a healed scar, superficial and of irregular outline. There were no vesicles, pustules, or other elementary manifestations. In the mouth there was extensive ulceration of the tonsillar fauces (Fig. 3). The ulcers were covered with a thick, gray membrane, and healing evidently was occurring underneath, but the tongue or buccal mucous membrane was not involved. Neurologic examination revealed peripheral anesthesia of the glove and stocking type, so common in hysteria, but there was also some muscular weakness and tenderness, particularly in the muscles of the calves, which was suggestive of peripheral neuritis. General physical examination otherwise gave essentially negative results. Routine urinalysis, and flocculation tests on the blood gave negative results. Mild hypochromasia was present, without basophilic stippling; the morphology of the blood cells and the differential count were otherwise essentially normal. Gastric acidity was normal. Roentgenologic studies of the thorax, stomach, colon and kidneys all gave essentially negative results. A culture of the throat was negative for *Monilia*. Because of the diarrhea, several examinations of the stool were made, but parasites or ova could not be demonstrated. Proctoscopy disclosed ulcerative proctitis of the anterior rectal wall (Fig. 4); the ulcerated portion had a gray base and a sharply defined, bleeding margin. Near the anus and in the median line there was a small slough. Analysis of the urine for metals disclosed the presence of arsenic, 1.0 mg. per 100 c.c., and of lead, 0.08 mg. in 800 c.c.

Although there were a number of possibilities, from a dermatologic standpoint, the cutaneous lesions were most suggestive of factitious dermatosis. On continued observation, the lesions of the throat and rectum seemed so unusual and bizarre that they also could be suspected of being factitious.

With these data in hand, we reviewed the patient's reaction to the severity of her illness. During the course of her examination she was at times indifferent; but still her readiness to have frequent inspections made of the ulcers of the skin and throat were so marked that at times it bordered on exhibitionism. In fact, she had encouraged her brother to examine daily, since the onset, the progress of the ulceration of her

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throat. From time to time she enjoyed recounting the apparent diagnostic difficulties of her problem.

However, in place of confronting the patient with the charge that her condition was self-induced, we dis-

cleaning the kitchen stove with lye, she inadvertently had dropped some of the chemical inside her slipper. Sensation was lacking in the feet, as a result of peripheral neuritis or hysteria, and an ulcer had developed

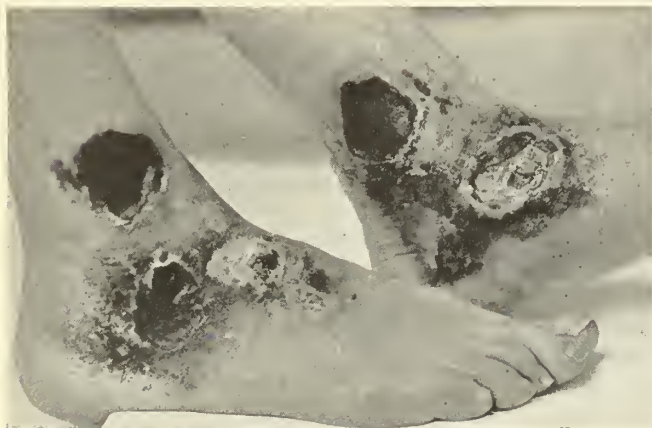


Fig. 1. Ulcers on the ankles.

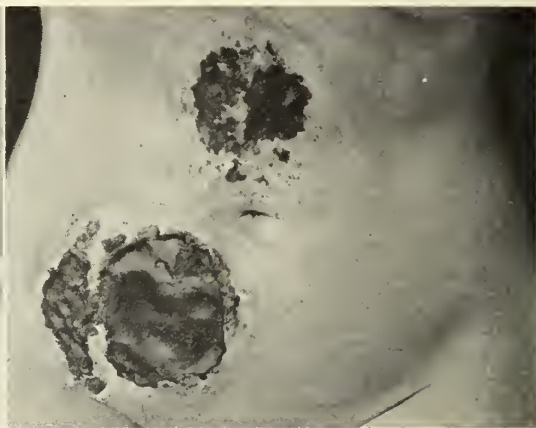


Fig. 2. Ulcers on the abdomen.

cussed the situation with her relatives, who, because of her previous good moral character and steady disposition, found it difficult to reconcile our views with theirs. Accordingly, in order to find a motive, to discover the method of production of the lesions, and to eliminate the possibility of overlooking some insidious organic disease, the patient was placed in the hospital.

Special attention was paid to the personal effects of the patient in a search for clues. Under occlusive dressings, the ulcerations of the skin improved, and new lesions did not develop. Without special attention, the ulceration of the throat proceeded to complete healing within ten days, and periodic reexamination of the region of rectal slough revealed similar steady improvement. During the course of our observation we repeatedly made it plain to the patient that we were aware of the etiology of the lesion, but we did not directly say that they were self-inflicted. We felt that more could be accomplished by appealing to her sympathy and intelligence than by directly charging her with what we believed, and thus possibly arousing her antagonism. Our supposition in this regard proved correct, and within ten days she became sufficiently remorseful to make a confession.

Lye, used for cleaning, had furnished an easily accessible agent for the production of the lesions. Those of the skin had been produced by rubbing with a cloth soaked in lye, and those of the throat by applying to the mucous membrane a lye-soaked cotton swab wrapped around the end of a pencil. The rectal ulceration had been brought on by thrusting into the rectum an enema tip which contained lye. This she had done, in lodgings, over the same period that she was making almost daily office calls at the clinic.

The particularly interesting part of the story, however, rested on the motive of partial suicide. Both parents of the patient had died, as has been said. The peripheral neuritis which had occurred in July, 1932, apparently had been caused by exposure to arsenic which had been used in spraying the orchard and chicken yard. The patient had inferred that she would become paralyzed. This trouble, following the death of her parents, caused her to contemplate the idea of a long life of invalidism and economic dependence, and suicide seemed to offer an outlet to her trouble. Because she was of a religious nature, and because she did not want to dishonor the family name, the idea of suicide was abhorrent to her. Then an accident had suggested a possible solution. One morning, while the patient was

before she was aware of the presence of the irritant. The idea then suggested itself to her of producing ulcers by applying lye to the skin, in the hope that a fatal infection might ensue. Thus, she might achieve suicide without it being known. Later she became fearful that amputation of an extremity might be necessary, and thus her trouble was markedly increased, without the end which she so desired being attained. At this time, during an epidemic of sore throat in the vicinity, she conceived the idea of producing septic sore throat through the use of lye. The motive for the production of the rectal ulcerations during the time when she making office calls at the clinic, apparently rested on a desire to increase the diagnostic difficulties of the case at a time when she felt that it was near solution.

Fortunately, the peripheral anesthesia improved somewhat during the later part of her stay in hospital. This, coupled with the optimism and freedom of mind which followed her confession, together with the relief experienced with improvement of the ulcers, enabled her to leave for home very much better, and with a good possibility of attaining permanent cure.

Comment

Cases of this type have been described by Stokes and Garner, Ormsby, and others, and the important points in their solution ably emphasized. However, several points of importance in the consideration of this unusual problem may be worth emphasis.

There was, in the case reported, an hysterical background, a direct motive furnished by an accidentally-incurred organic disease. On the latter motive hinged the production of the entire factitious syndrome.

It was apparent that the various ulcers of the skin and mucous membranes were confined to sites that were most easily accessible. The ulcers themselves were markedly destructive, and at the same, of a uniform stage of development. Furthermore, the tough black sphacelus, which adhered to the surface of each lesion, was typical of the crust which forms when concentrated acids, phenol, lye, or other escharotics come in contact with the skin. This medley of unnatural

objective features failed to conform to the pattern of any well recognized pathologic ulceration of the skin or mucous surfaces. Therefore, our suspicion was aroused that the entire process was factitious.



Fig. 3. Ulceration of tonsillar fauces.

In cases of this sort, although the physician may have a well-founded suspicion as to the true state of affairs, unless the motive and method of production of the lesions are ascertained, and a confession obtained, the diagnosis will prove futile and unproductive of cure. Observation in hospital, if carried out under strict surveillance, confirms suspicion, and prompt improvement of the lesions, with failure of new ones to appear, furnishes a firm foundation for the final step of obtaining a confession. In dealing with stupid or dull patients, the sudden, direct confrontation, the "cathartic method" as it is called by Stokes, may be



Fig. 4. Ulcerative proctitis.

used, but it is likely to prove ineffective in dealing with intelligent individuals and to arouse antagonism which will seriously delay solution of the problem.

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IRONIZED YEAST

The Bureau of Investigation of the American Medical Association reports that the public has been made what the advertising men would call "yeast-conscious" by the extensive and intensive advertising of the Fleischmann product. The facts are, of course, that as a medicine yeast has no important place except as a means of furnishing Vitamin B, which ordinarily should be and would better be obtained from one's food. But the public is not aware of these facts, so that it is not surprising that, by plausible advertising a "patent medicine" called Ironized Yeast has been built up into one of the best sellers in the nostrum field. Ironized Yeast advertising is typical of the times. In the newspaper advertising of Ironized Yeast, skinny versus well-developed men and angular versus well-curved women are brought into juxtaposition with the object of showing how necessary a rounded figure—and therefore Ironized Yeast—is to achieve economic or social success or marital happiness. Ironized Yeast comes in a bottle of fifty tablets costing \$1—that is, the tablets cost 2 cents apiece. The public is urged to

take from eight to twelve tablets a day for from two to three months; thus, at twelve tablets daily, the cost for three months would be \$21.60. According to the Ironized Yeast Advertising, the product is "made from specially cultured *brewers' ale yeast* imported from Europe"—claimed in earlier advertising to be from Bass' Ale brewery—which, it is alleged, "by a new process is concentrated 7 times." Further, this yeast "is then *ironized* with 3 kinds of strengthening iron." From the various analyses which have been made of Ironized Yeast, including that of the A. M. A. Chemical Laboratory, it appears that Ironized Yeast is essentially yeast with small amounts of iron and phenolphthalein. The concern which sells it has attempted to obtain testimonials from physicians by offering them a bottle of perfume, and testimonials from the general public by the promise of a picture. The Ironized Yeast advertising carries the impression that by taking the preparation undernourished and angular women can in a few weeks' time (usually three) be transformed into examples of rounded buxomness, while skinny men, by the same method, can undergo a similar transformation. (*Jour. A. M. A.*, May 19, 1934, p. 1697.)

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BUSINESS MANAGER

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Poliomyelitis Vaccination

Each year or two an epidemic of poliomyelitis appears in some locality. Two years ago Philadelphia suffered, and the epidemic this year in California has been most tragic. The disabling effects of the disease, attacking mostly small children, make every epidemic serious.

So far efforts at active immunization have not been outstanding. The need for some reliable method of vaccination which can be used on a large scale in the face of a threatened widespread epidemic is obvious.

Kolmer's work offers a reasonable hope of success. Working at Temple University in Philadelphia he followed the lead reported in 1927 by McKinley and Larson whereby these Minnesota men were able to immunize monkeys by injections of emulsified cords from other monkeys suffering from the disease, which were treated with sodium ricinoleate. He has confirmed the production of immunity in monkeys and, what is more, demonstrated the production

of an antiviral in himself and his coworker by the same method. Having convinced himself of the harmlessness of this devitalized virus, Kolmer is now vaccinating a group of children who are known to be lacking in the antiviral in their blood, in an attempt to prove that small doses of his preparation will consistently immunize them against the disease.

As Kolmer states, he is rather reluctant to recommend a virus which is not "dead," but only attenuated by the sodium ricinoleate, and most physicians will react similarly. Doubtless considerably more experimental work will be necessary and criteria for the preparation of the vaccine established before widespread adoption will be possible.

The development of a simple and effective technic for diphtheria immunization required many years. Tragedy played a part, but the final outcome was successful. Undoubtedly it will require considerable more investigation and trial before the same result will be accomplished in the case of poliomyelitis. There is reason to believe, however, that the first steps reported will lead to the final prevention of this much dreaded disease.

Healing In The Tuberculous Lung

In the treatment and post-sanatorium care of tuberculous persons, among the many important questions which must be faced by the physician is one that stands out clearly, involving, as it does, prognosis. This is the factor of healing. Obviously an accurate appraisal of the healing process in pulmonary tuberculosis is desirable from both the doctor's and the patient's viewpoint. At the recent meeting of the Minnesota Trudeau Medical Society in Saint Paul, Dr. J. Burns Amberson of New York City gave a most satisfactory résumé of the subject from the clinical, x-ray and laboratory points of view.

His illustrative material covering a period of twenty years brought out several pertinent observations. Calcified areas, for instance, so commonly held to be expressive of healed tuberculosis, more frequently than not harbors living

virulent tubercle bacilli and represent a change indicative of local tissue degeneration rather than a reparative process. The exudative lesions which clear so miraculously on the x-ray film do not hold forth such an excellent outlook as the change might suggest, due probably to the fact that these patients receive treatment of inadequate duration because of the rapid clearing which leaves behind small, poorly encapsulated caseous foci. The type of lesion which leaves on the x-ray film a strand-like infiltration, interpreted as fibrosis, offers a better prognosis and this type frequently in time becomes sterile and therefore incapable of recurrence. This type, however, may lead to localized emphysema, bronchiolectasis or bronchiectasis with their attendant manifestations.

Physical signs are not dependable in estimating the healing process. Medlars blood count and the erythrocyte sedimentation rate are helpful, as are examinations of sputum once positive but becoming negative not only to microscopic examination but to guinea pig inoculation.

Dr. Amberson also emphatically stressed the element of time in the treatment of pulmonary tuberculosis in its relation to the healing process. Short cures are most apt to end in recurrences; sufficient time, one or two to five years, depending on the type of lesion and anatomical extent, is imperative.

These observations, coming as they do from a clinician of wide experience, international reputation and above all from one who exhibits clinical sanity in a rare degree, merits close scrutiny and intelligent reaction.

E. K. G.

Accident Insurance

The moral hazard involved in health insurance has largely resulted in its not being profitable business. Not so with accident insurance. There is less opportunity for dissembling in case of accidents, and many accident policies offering various coverage are available.

We venture the opinion that most physicians, like most purchasers of insurance, accept statements of insurance agents and do not carefully read their policies. In this belief attention is called to the subject. We must admit, however, that an analysis of most insurance contracts re-

quires the services of a lawyer conversant with legal interpretation of such contracts.

The variation in the cost of accident insurance is explained by the variation in the restrictions contained in the policy. The limitations of a policy are usually clearly defined. The wording of the restrictions of the policy determines the value of the contract, for after all, upon the legal interpretation of the policy as a contract depends its value to the holder. Many policies are apparently examples of sharp practice and misrepresentation, and purchasers too often pay for something they do not get.

The following editorial which appeared in the *Journal of the Michigan State Dental Society* for December, 1933, and was reproduced in the *Minneapolis District Dental Journal* for March, 1934, is so much to the point that it is being reproduced here. After all, publicity offers the only means of eliminating these tricky policies.

DO YOU UNDERSTAND THE PROTECTION YOU HAVE PURCHASED IN YOUR HEALTH AND ACCIDENT INSURANCE

The timely editorial published last month, and the request of Dr. Rickert to elucidate on this subject, touches a problem in which I have been interested for some time. Frequently complaints are heard against the insurance companies and they are accused of much misrepresentation. Many of these complaints are justified, as the insurance salesman either does not understand his own policy, or deliberately misrepresents it. However, it is high time for the professional man to understand these matters and cease to be easy prey to a smooth sales talk.

How many of us have hastily read our policies and impatiently assumed that all the supposed persiflage contained therein was standard form, and meant nothing to us? As a matter of fact, the actual intent of each word, and even the position of a comma, may change a Supreme Court decision. We are willing to spend between seventy-five to one hundred and fifty dollars per year to enjoy a supposed security, which under many conditions does not exist. If we were to analyze the exact wording of the policy, the discovery that we are paying for a great deal less than we think we have purchased, will soon be apparent.

Many smaller claims are paid even up to one hundred dollars, for which according to the wording of the policy the company is not actually liable. These are paid to maintain good will, and in my opinion to prevent a general cancellation by policyholders. If the sheep can be kept docile they can always be shorn when the big claims are presented.

To clarify and illustrate the situation let us study the most important part of any policy, namely: the "Insuring Clause," and confine ourselves to accident policies. Now let us group all the policies into two classes. First the large majority which use the expression "bodily injury resulting from *Accidental Means*," and second, the very small minority which use terms equivalent to "*Accidental Bodily Injury*" or "bodily injury from an *Accidental Event*."

Let us clearly understand that a bodily injury may result from either "*Intentional Means*" or "*Accidental Means*." The means in either case produces an injury.

If you lift a heavy desk, or voluntarily perform some act that results in an accidental injury, you have been injured by Intentional means, and this is not covered by the policy. A police officer mistaking you for a fugitive may shoot and kill you. This is an intentional act and the indemnity will not be paid. The use of the words "accidental means" has won many Supreme Court decisions for the insurance companies, and obviated the payment of large claims to policy holders who did not analyze their policies.

In an examination of the insuring clause of one hundred and eighty-five policies I have found twenty-six to use the unmodified expression "Accidental Means." Fifty-eight more add further limitations by the additional use of the words "Solely and Directly by Accidental Means." Let us assume that your death was caused by accidental means, but a contributing cause intervened and became responsible in itself for the death. While this secondary cause resulted from the accident, nevertheless, you have no insurance, as the death or disability was not caused Solely and Directly by accidental means.

Thirty-five additional policies still make this more emphatic by adding to the above the words "Independent of All Other Causes."

Thirty-nine other policies use the expression "*External, Violent and Accidental means*" with and without the additions just above enumerated. Let us consider the effect of the words *External and Violent*. Suppose you are struck a blow on the chest and develop pneumonia. This is internal. Perhaps you may sneeze and unexpectedly produce an injury to your back or be injured with an enema, etc. Now the term "*Violent*" means just that. *Great* physical force must be present, so if you cut or prick your finger, bruise your hand, trip over the cat and wrench your knee joint, the element of "Violence" is not present.

In fairness to the insurance companies, we must observe that the premium for policies which give us a very limited insurance, is considerably less than those written for the purpose of giving us coverage. However, many expensive policies contain these limitations, and it behooves us to understand what we are getting for our money.

Out of the one hundred and eighty-five, only twenty-seven had an acceptable Insurance Clause. Most of these insured for "Accidental bodily injury," two for "Personal injury effected by a purely Accidental Event," three for "Against effects resulting from bodily injury," and three more which were not so good "External, Violent, and an accidental event."

The next important factor is the "Time Limit Clause." This clause or the Total Disability Clause will specify whether the disability must result from the date of the accident, or may begin within a specific number of days after the accident. It also indicates the period after which Specific Indemnities, or the Principal Sum, will not be paid. In this connection it is important to realize that many accidents do not produce a disability immediately. Notwithstanding a special Septic Infection clause, if the disability must qualify on the date of the accident, then this special clause would be of small help.

Does your policy cover Infections including Hydrophobia, and if it excludes Internal injuries and does not specifically enumerate—Sunstroke, Freezing by involuntary exposure, Involuntary Asphyxiation, Ptomaine or other accidental poisoning, you have no coverage on these types of accidents.

The John W. Bell Lectureship

In paying a tribute to the late Dr. John W. Bell, a dearly beloved member of our profession, by establishing a Tuberculosis Lectureship in his name in the Hennepin County Medical Society, the Hennepin County Tuberculosis Association has found a most commendable way of honoring a great man, and, at the same time, of serving the medical profession of the state.

Dr. Bell's leadership, his wisdom, and his human qualities are a tradition among the thousands of practicing physicians who were his students and colleagues. No eulogy of him is necessary here. In founding an annual Tuberculosis Lectureship in his memory, the Hennepin County Tuberculosis Association is commemorating Dr. Bell in a manner which would have given him much pleasure, for this lectureship will bring to local physicians each year the latest scientific advances in combating tuberculosis.

Dr. Gerald B. Webb, who will deliver the initial lecture, is widely recognized as an outstanding leader in the field of tuberculosis.

The establishment of this lectureship is, we believe, a step forward, marking, as it does, a closer relationship between the Tuberculosis Association and the medical profession.

N. O. PEARCE.

MEDICAL BROADCAST FOR THE MONTH

The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 10:45 o'clock every Tuesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of November will be as follows:

- November 6—Diabetes in Minnesota.
- November 13—Blood Transfusions.
- November 20—Progress in Public Health.
- November 27—Warts and Moles.

FELSOL

According to a brochure entitled "Contribution to the Therapy of Bronchial Asthma," by Dr. M. Kaercher, the composition of Felsol is now given as: Metozin 0.9 (Phenazone 0.25, Anilipyrine 0.4, Iodpyrin 0.25), Caffeine 0.1, digitalis and strophanthus glucosides 0.0015, and the alkaloid lobelia inflata 0.005 Gm. Tests made some time ago in the A. M. A. Chemical Laboratory indicated that the product contained an acetanilid derivative in addition to other products. The substance may be looked on as a shotgun type of mixture promoted in typical "patent medicine" style. (*Jour. A. M. A.*, February 24, 1934, p. 640.)

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association

B. J. Branton, M. D.

W. F. Braasch, M. D., Chairman

J. C. Michael, M. D.

Shall We Be Lay-Dominated?

The following excerpts from a talk given recently before the Chicago Medical Society by Dr. Francis Ashley Faught of Philadelphia, chairman of the Philadelphia County Medical Society's Commission on Medical Economics, are equally pertinent in Pennsylvania, Illinois or Minnesota. Read them!

"If the physician is to hold his place in organized society, there must be a better planned unity, agreement and continuity of thought among doctors. Economic readjustments are in the making, and we must develop definite plans, because we have a definite responsibility in shaping this growth, and controlling these changes, particularly as they touch upon our sphere of activity. . . ."

Dr. Frederic E. Elliott, Chairman of the Committee on Medical Economics of the Medical Society of the State of New York, said: "If the physician will not become an economist in his own domain, then he seems destined to yield his knowledge and skill to be the object of commerce and communal experiment."

"Our aim should be to discover a way to assure that the private practitioner shall continue to give a good quality of sickness service to all classes, including those unable to pay, and at the same time to preserve to himself, and to the medical profession, the practice of medicine. . . ."

Look for Leaders

"Efficient leadership in medicine has never been so greatly in demand as at the present time. Every organized group throughout the country should seek diligently to discover efficient leaders, and, when they are found, to offer them every encouragement and support. There was never a time when medical organization was more important than today. Active and efficient committees on medical economics must be organized in every county. There is a job for every physician everywhere, and the work involves not only intensive study in order to discover existing evils, and to establish basic principles, for their restric-

A Letter From The Minnesota State Medical Association To The President Of The United States

October 24, 1934

The President,
Washington, D. C.

Sir:

We note in the *New York Times* of Saturday, October 13, a list of committee appointments to assist in reports upon special problems that are to be dealt with by your Committee on Economic Security.

One of these committees is to report on the problem of sickness and the distribution of medical care.

The Council of the Minnesota State Medical Association has requested me, as secretary, to write to you and respectfully to suggest that, in the handling of this matter, the organized medical profession of the United States be given full opportunity to express its viewpoint with respect to sickness insurance to this committee.

The American Medical Association has, for the past three years, been making an intensive study of the operation of sickness insurance in foreign countries. It has accumulated a great deal of information which we believe should be presented to this committee in the hope that a sane and practical program can be developed.

Certainly the point of view of the average general practitioner, who has always provided medical service for the very group that is to be considered by this committee, should be of value.

We, therefore, respectfully urge that the Bureau of Economics of the American Medical Association, which represents the practicing medical profession of the country, be given an opportunity to present its views to the committee and to you before any definite recommendations are made to Congress.

Respectfully submitted,
E. A. MEYERDING, M.D.
Executive Secretary.

tion and curtailment, but also to constantly watch for those insidious forces that are even now trying to gain control of the practice of medicine, largely through some sort of manipulation of medical service, not for public benefit, or to aid the physician, but for personal profit. It re-

mains for the medical profession to determine whether it shall be a lay-dominated, politically controlled and paid organization, or whether it shall preserve medicine as a profession to physicians. . . ."

"It will require intelligent coöperation on a broad scale, in order to assure the public of adequate medical care, and at the same time to maintain those basic principles necessary to assure the continuation of the personal relationship between the patient and his private physician. This is the foundation stone of medical practice, and it must not be dislodged; to preserve it, we must develop coöperative medical endeavors of such a type that initiative will not be destroyed, or compensation unfairly diverted. . . ."

Not a Material Commodity

"In all discussions of medical economics, it is important to bear in mind that one of the most, if not *the* most distinctive characteristic of our service is that we do not distribute a material commodity, like food or clothing. It cannot, therefore, be separated from the producer, and hence it never enters into a market, in the same sense that material commodities do. Therefore, it is not subject to the same factors of supply and demand, etc., which influence the exchange of material wealth."

"It may therefore be accepted that the practice of medicine does not fit into the picture of general economics, and that any attempt to force it to conform to the same frame will not only result in great confusion, but, if carried to a logical conclusion, will result in untold harm to the public and to the medical profession, by causing deterioration of the character of medical service rendered, and by depressing still further our already greatly reduced income."

Britain Has No Choice

The following paragraphs were picked from an important paper on British Health Insurance read by Dr. R. G. Leland, Director of the American Medical Association's Bureau of Economics at the Secretaries' Conference at Chicago in September. The complete paper will doubtless appear shortly in the Bulletin of the American Medical Association and deserves careful reading there.

"The outstanding fact is that insurance has removed the possibility of a choice among the ways of meeting such problems. If we are to judge by the plans proposed by the British Medical Association and the public there is recognition, if not acceptance, of the inevitability, but not yet of the desirability, of the complete socialization of medicine.

Less Than Half Are Registered

"This situation may offer an explanation why nearly all of the statements of the representatives of organized medicine in Great Britain are favorable to insurance. The British Medical Association is now so deeply involved in the scheme and has given such hostages to political fortune in connection with its administration that it is pledged to its defense. Before accepting the statement which is so frequently made that the British physicians are practically unanimous in favor of insurance, it is well to consider that every physician has a chance to vote his approval in the most effective way by signifying his willingness to practice under panel conditions. Judged by this test, only 44 per cent of British physicians have so registered their willingness. The remaining 56 per cent apparently are not willing to accept the conditions of the scheme. Furthermore, of the 44 per cent that are registered as panel practitioners, there are many who still depend primarily upon private practice but who only enter their names upon the panel because of local situations.

"Much is made of the claim that insurance has increased the income of the panel physician. We can well believe this when we remember the conditions that preceded insurance. It has undoubtedly raised many physicians from a 'starvation' to a 'subsistence' level. The average income of a panel physician from insurance is about \$2,000.00 annually. Approximately \$1,000.00 of this must be spent in maintaining this practice. This does not indicate a very high level of payment, even though we remember that panel practice is often incidental and that the main dependence is upon private patients.

An Accomplished Fact

"The real reason why organized medicine in Great Britain and the great percentage of the population now express more or less of approval of insurance is because it is now an accomplished fact.

"Apparently, there is no movement in England to abolish health insurance. Such a movement would be futile. The nation has now progressed too far along the road. There is no turning back. The United States is not now where England stood in 1911. It is in a far more favorable position to choose the road it will follow. It has developed methods of meeting the prob-

lems of medical care that are far in advance of those existing in England at that time.

"We can still choose, but we must choose the road we will take and, having chosen, we must follow it. After the choice is made and institutions established, vested interests are created and political forces set in motion. It is then extremely difficult, if not impossible, to reverse the direction of the movement.

We Can Choose

"We must face the fact that if we enter upon this road there is little if any reason to believe that we can avoid the evils and take only the good of health insurance.

"If we decide to take the other road, to continue the practice of medical principles which have proved their value through so many centuries and to develop into an organized whole all the resources of private and institutional medical facilities and public and preventive medicine, we will have before us all the possibilities of flexible growth and development which are closed to us if we enter upon the closely walled road of insurance institutions.

"The choice of a road in England over which to carry medical care was not alone for the convenience and desires of the politicians, or for the magnanimous impulses of employers or friendly societies; the choice did not involve solely the interests of the medical profession. At the end of twenty-one years that road has become the avenue through which more than 17,000,000 people are supposed to obtain their medical services.

"If the medical profession of the United States intends to hold fast to its resolution to maintain for its prime object the services it can render to humanity, it cannot choose a road for itself—the road it chooses over which to carry medical care to humanity must be traveled by human individuals as well as the medical profession. That road should then be sufficiently open and broad to serve the best interests of those for whom it is built—the people and their physicians."

Michigan Plan Is Repudiated

The Michigan House of Delegates has "pigeon-holed" health insurance.

Last year Michigan sent Dr. H. A. Luce

and Nathan Sinai, Dr.P.H., to England to study the English system of insurance medicine.

Last Spring these emissaries reported—and reported in such glowing terms—that the Michigan delegates instructed them to draw up a plan for Michigan which should be voted upon at their fall meeting. They went so far as to approve the principle of compulsory health insurance and become the first state medical society thus to go on record.

It so happened, however, that the annual meeting of the American Medical Association intervened, with results that are well known to all.

A ten point platform was drawn up at Cleveland against which every scheme for delivery of medical service must be measured. The white light of a considerable research into the actual workings of a large number of insurance schemes here and abroad was turned upon the whole question and the temper of the vast majority of the physicians of America showed itself as emphatically opposed to any sweeping change in medical practice in the United States.

No Publicity

The great foundations, whose whole force has been directed of late toward re-organization of medical practice, rejoiced and gave wide publicity to Michigan's action. The Luce Sinai plan, which was speedily forthcoming, was promptly put in the hands of all the newspapers.

Now that the Michigan plan has been quietly dropped, it is to be noted, however, that no rejoicing and no news releases on the subject have accompanied the final rejection. In the meantime the Wayne County Medical Society in the city of Detroit is quietly going ahead with a plan for easy long time payment for medical care which is notably successful so far and seems also to be entirely acceptable to the physicians of Detroit.

Those Hired Examiners

Two "teams" of physicians and nurses in the employ of the Safety and Compensation Division of the State Emergency Relief Administration are now at work on the rural districts of the State. Three others are employed in the Twin Cities.

The character and function of these teams has been questioned by a large number of physicians. It is explained as follows by C. H. Zealand, Director of Safety for the Division:

The teams are made up of two doctors each and two nurses.

They are engaged, exclusively, in giving physical examinations to relief workers employed on Emergency Relief Work projects and administrative employees of the SERA.

The object is to determine the fitness of these people for the work on which they are to be employed and to direct them to the type of work which they can do without harm to themselves and the danger of creating new disabilities for which the state will have to take care.

All workers are classed, according to findings of the examiners, as follows:

- A. Suitable for any kind of work
- B. Suitable for moderately light work
- C. Suitable for particularly light work
- D. Requiring medical attention.

Those who are found to need medical attention are immediately referred to the County Relief Worker for care by local doctors under the regular plan for medical relief. *The examining teams give no medical treatment whatever.*

The same plan of procedure is in use in many other states and has been found both humane and economically sound.

A surprisingly large number of cases of high blood pressure have been found, according to Mr. Zealand, among comparatively young workers. These have been removed from employment involving work on ladders and high places. Detection of hernia is frequent, also, and patients are referred to local physicians for treatment. Tuberculosis is also discovered rather frequently among both relief workers and administrative employees.

Funds available are too small to permit the Division to pay local doctors the regular allowance for physical examination under the direct relief schedule to do the work. The physicians employed come from all parts of the State. In two instances they were recommended for the positions by their county medical societies.

Conferring With The Legion

The scale and possible extension of hospitalization for veterans is by no means a closed issue.

With each session of Congress there is more than a possibility that the whole question of veterans' benefits will be re-opened or materially amended.

In view of that fact, the close association

maintained between the legislative sub-committee of the American Medical Association and the special committee of the American Legion whose legislative program for veterans carries weight in Washington, is important.

At a recent meeting of these two committees in Chicago the entire question of a possible increase in hospitalization offered to veterans and the possibilities for extension of such care in their local communities were extensively discussed.

Representatives of both organizations were agreed that the Veterans Administration was not taking full advantage of privileges allowed under current regulations for hospitalization of veterans outside of the Veterans' Hospitals.

No Increase in Hospitalization

It is encouraging to note, however, that representatives of the Legion express no intention of asking for an increase of hospitalization of veterans except in a few isolated and exceptional instances from the next Congress.

The Veterans' Administration appears, also, to see no need for further increase of government hospital facilities except, here and there, for the care of neuro-psychiatric cases.

The following interesting recommendation was made by the joint group in Chicago.

That there should be close coöperation between the National Executive Committee of the American Legion and the Board of Trustees of the American Medical Association and that requests for additional hospitalization be referred to the American Medical Association. The medical association is then, in turn, to seek advice of a group composed of representatives of the Legion, of the state medical association, the state hospital association and the Veterans' Administration in the state from which the request has come. This advice is then to be transmitted to national headquarters of the American Legion.

They Welcome Medical Advice

A keen desire on the part of the representatives of the Legion to coöperate with the medical profession was shown in this conference. They will welcome medical advice on all questions relating to the care of sick veterans.

Invitation was again extended to the American Medical Association to send representatives to the national convention of the American Legion at Miami.

"The Foundations Speaking"

If you should turn the radio to Chicago, Milwaukee, Columbus, Cleveland, among other cities in a coast to coast network, any Monday evening between now and February, you are likely to hear a series of radio talks on the intriguing subject, "Doctors, Dollars and Disease."

Perhaps you have already received advance publicity on the program which has been sent out very widely in the name of the National Advisory Council on Radio in Education.

It is understood in well informed quarters that the series is financed by the Foundations that backed the Committee on Costs of Medical Care in the hope of arousing public interest in Health Insurance.

Academic Speakers--Not M.D.'s

The list of speakers and their subjects confirms this understanding. Most of them are doctors of philosophy rather than of medicine. Many of them are signers of the majority report of the Committee on Costs of Medical Care. Only one, Dr. Nathan B. Van Etten of New York City, can fairly be said to represent the practicing physician. And Dr. Van Etten's subject is restricted to a discussion of the abuses of medical charity in New York City.

William Trufant Foster, Ph.D., director of the Pollak Foundation for Economic Research, is chairman of the committee in charge. Other members are Dr. H. S. Cumming, Dr. Haven Emerson, Dr. Alice Hamilton, Dr. Thomas Parran and Dr. Ray Lyman Wilbur.

November, December Schedules

The November and December speakers include Dr. Parran, New York State's Health Commissioner, on "Public Health Needs," November 19; Dr. George H. Bigelow, Director of the Massachusetts General Hospital, on "Preventive Medicine," November 26; Dr. Van Etten speaks on December 3; Dr. Wilbur, now president of Stanford University, on "The Doctor's Part in Medical Care," December 10; Paul H. Douglas, Ph.D., Professor of Industrial Relations, University of Chicago, on "Uneven Costs of Sickness; How to Meet Them," December 17; Mr. Foster on "Tiny Tims of Today," December 24; Michael M. Davis and C. Rufus Rorem, Ph.D., CPA, Julius Rosenwald Fund, Chicago, on "Progress in 1934," December 31.

The omnipresent and irrepressible Mr. Davis who, incidentally, appeared on the program of the famous meeting in Philadelphia at which Dr. Morris Fishbein, single handed, defended the cause of the private practice of medicine, was scheduled to talk to the Association of Junior Leagues of America in convention in Minneapolis in October.

Reaction Of Labor To Health Insurance

Much has been alleged, perhaps rightly, on the subject of the dissatisfaction of the average American, particularly in industry, with the American system of medical practice.

These statements in behalf of the American working man have come, for the most part, not from accredited representatives of the workingman, but from the sponsors of studies by social service workers whose training and prejudices may not equip them to speak authoritatively in this very important matter.

Just what does the average American worker think of American medicine?

Is he dissatisfied? Does he want a change? Is he interested in Health Insurance as the solution of his medical problems?

Certainly somebody ought to find out just what labor unions and their representatives think of the whole problem of medical care before any experiments in social medicine, which will certainly fail without the interest and support of these elements of the population, are undertaken.

The American Medical Association, through its Legislative Committee, is now undertaking to find out, in as direct and practical a manner as possible, the answer to these questions.

The investigation will be carried on on a nation wide scale after a system of organization already well worked out. This important action follows a sensible recommendation to that effect made by House of Delegates at Cleveland.

Radio Education

Patent medicine advertisers find Minnesota the poorest state in the Union for response to their advertising in proportion to the amount of money they spend.

Why?

Better health education and a higher popular

standard of intelligence always coöperate to cut down returns on this type of advertising.

That there should be some relation between the vigorous public health education programs of the Minnesota State Medical Association—particularly its radio and newspaper health service programs—and this poor response of Minnesotans to patent medicine advertising is surely a legitimate inference.

In that connection, the last report of the association's radio committee is particularly interesting and significant.^o

Reaches Millions

The radio program of the association is now more than five years old and has, literally, reached millions of persons. Its popularity and effectiveness are well shown in the 1934 report.

In the last five years, Dr. William A. O'Brien, speaker from the start, has given 324 fifteen minute talks over WCCO, 59 of them within the past year.

The popularity of these programs judged by commercial standards is extraordinary. Each week brings in from five to twenty-five unsolicited letters from regular listeners.

Popularity Test

And the last real popularity test—the offer of the booklet "What Everyone Should Know About Cancer" made at just one broadcast in December, 1933, brought in 2,475 requests! This is the all-time station record for a morning broadcast.

As a direct result of the radio contact with the public, Dr. O'Brien has also made 94 talks in person during the last year, reaching an estimate of more than 14,000 persons.

All of these talks over the radio and from the platform have been on health and preventive medicine.

Two broadcasts each month have been devoted, in accordance with agreements with the heart and cancer committee, respectively, to heart and cancer education.

The following list of subjects covered between the date of April 5, 1933, and June 15, 1934, will be of interest.

Subjects of Radio Broadcasts

April 5, 1933, to June 15, 1934

Cancer of the Cervix	Chickenpox
Cancer of the Rectum	Child Health—A Challenge
Cardiac Asthma	Chinese Medicine
Care of Crippled Children	Congenital Heart Disease
Cause of Anemia	Coronary Disease
Cause of Hay Fever	

Crippled Children and Their Problems	Mental Health in Childhood
Dementia Precox	Obesity and Heart Disease
Dermatitis and Cosmetics	Patient and Doctor
Diphtheria	Periodic Health Examinations of Men
Do Germs Cause Cancer	Periodic Health Examinations of Women
Environmental Medicine	Problems of the Premature Infant
Family Jaundice	Sanitary Achievements
First Aid in Poisoning	Some Heart Disease Problems
Food Magic	Sugar Hunger
Forerunners of Cancer	The Cancer Problem
Galvanic Mouth Burns	The Common Cold
Getting Ready for School	The Heart in Goiter
Hand Infections	The Heart in Infections
Hardening of the Arteries	Treatment of Diabetes
Health Value of Play	Treatment of Varicose Veins
Heart Fear	Tuberculin Testing
Heart Murmurs	Tumors of the Bladder
Height, Weight and Health	Tumors of the Prostate
Heredity and Cancer	Tumors of the Skin
History of Cancer	Twilight of Hearing
Insulin and Underweight	What Price Health?
Jaw Tumors	When the Baby Cries
Little's Disease	
Low Blood Pressure	
Measles	
Medicine of the Aborigines	

Seen By The Secretary

Being the Log of the Month of a Busy Medical Executive

Sunday, September 23.—All-day conference of the Executive Committee of the Council with Benjamin E. Youngdahl, Director of "Human" relief for the State Emergency Relief Administration; later with C. H. Zealand, Director of Safety, W. T. Norton, Director of Compensation, and A. V. Rohweder, Chief Advisor, all of the Division of Safety and Compensation of the State Emergency Relief Administration. The Council committee called in, among others, D. D. Turnacliff, of Minneapolis, Surgeon for the Street Railway Company, as consultant.

Allowance schedules for medical care of relief clients and of relief workers injured on relief work projects occupied most of the day's discussions—difficult problems. It is to be hoped, as a result of this meeting, that satisfactory agreements may soon be reached.

Monday, September 24.—Lunched in Saint Paul with Herman Johnson. Discussed medical affairs of the state.

Tuesday, September 25.—In Martin County. Conferred with R. C. Hunt, Fairmont, and S. A. Slater of Worthington.

Wednesday, September 26.—To Cedar Rapids, Iowa, for the Mississippi Valley Conference on Tuberculosis.

Monday, October 1.—Fine meeting of the Dakota County doctors at the home of H. R. Tregilgas in South St. Paul. The Dakota County Advisory and Contact Committee of three elected.

Tuesday, October 2.—Lunched with the committee of Deans of the University of Minnesota, who are preparing for the June meeting in Minneapolis of the American Association for the Advancement of Science. The meeting will be held at the same time as the an-

nual meeting of the Minnesota State Medical Association, with distinct advantages to both.

Wednesday, October 3.—To Fergus Falls for the annual meeting of the Minnesota Federation of Women's Clubs. Presided at the Minnesota Public Health Association's Health Court at which O. J. Hagen, Moorhead; W. L. Burnap, Fergus Falls; C. O. Estrem, M. W. Kemp, Fergus Falls; Kathleen Jordan, Granite Falls; and W. S. Broker, Battle Lake, served as medical witnesses.

Saturday, October 6.—Attended a meeting at the State Capitol of the Sanatorium Conference and the State Board of Control. Saturday evening at the Trudeau Society meeting in the Ramsey County Medical Society rooms in St. Paul. J. Burns Amberson of Bellevue Hospital, New York City, spoke.

Monday, October 8.—Executive Committee meeting of the Minnesota Public Health Association at headquarters, 11 W. Summit Avenue, Saint Paul. The following physicians are members of the Health Association's Executive Committee: C. H. Mayo, M.D., Rochester; J. A. Myers, M.D., Minneapolis; C. B. Wright, M.D., Minneapolis; E. K. Geer, M.D., Saint Paul; Geo. A. Earl, M.D., Saint Paul; S. A. Slater, M.D., Worthington; A. T. Laird, M.D., Nopeming.

Tuesday, October 9.—At Winona for the annual meeting of the Winona County Public Health Association.

Wednesday, October 10.—Talked to the boys at St. Mary's College, Winona.

Wednesday, October 17.—Presided at another Health Court for the Minnesota Congress of Parents and Teachers at Albert Lea. Medical witnesses this time were R. M. Wilder, Rochester; Horace Newhart, Minneapolis; Kathleen Jordan, Granite Falls; and W. D. Beadie, Cannon Falls. These Health Courts constitute an effective and very popular form of lay health meeting.

Wednesday Evening.—At the Freeborn County Medical Society meeting. Dr. Wilder and Dr. Newhart spoke. These men are chairmen, respectively, of the Committee on Diabetes and the Committee on Deafness Prevention and Amelioration and greatly interested in their work. They have something to tell that every doctor in the state should hear—something that is important to every doctor's private practice of medicine. It is to be hoped that every medical society will arrange to have them talk.

Thursday, October 18.—Evening—Special meeting of the Emergency Committee of the Council for final agreement on medical allowance schedules. Official bulletins on the matter will be issued shortly by the State Emergency Relief Administration. Mr. Youngdahl attended.

Friday, October 19.—At Worthington for the Southwestern Minnesota Medical Society meeting. Program: President F. J. Savage spoke on "The Work of the State Society"; Dr. Henry Meyerding of Rochester

talked on "Fractures"; Dr. C. B. Wright of Minneapolis on "Coronary Thrombosis"; and Dr. J. A. Myers, Minneapolis on "Chest."

Minnesota State Board Of Medical Examiners

Freeborn County Quack Put Out of Business

Paul Richard, also known as "Doc" Richard

Following an investigation made by the Minnesota State Board of Medical Examiners, Paul Richard, also known as "Doc" Richard, has been stopped from practicing healing at Myrtle, Minn. Richard has been practicing in this little community in Freeborn County since about June 12 of this year. People were going to him from near and far, some patients traveling forty to fifty miles to visit this great "healer."

When questioned, he admitted that he was not licensed to practice healing anywhere in the United States, but claimed to be a graduate of a medical school in Berlin, Germany. However, he had neglected to bring his diplomas with him and claimed that he had left them at Conrad, Montana. When asked what kind of healer he was, Richard replied, "I am a Hindu healer." His treatment consisted of a light form of massage and the application of salve and ointment to that particular portion of the body that he was working on. The investigation discloses that he was seeing from fifteen to fifty patients per day. He made no charge, but accepted whatever was given to him by the patients. He felt quite sure that he was immune from prosecution because he charged no fee. In this he overlooked the well drawn provisions of the Basic Science Law that make it unnecessary for a person to charge a fee in order to be guilty of violating the law.

Richard came to Minnesota, according to his story, from North Dakota. He stated that he was not a native of this State and asked that he be given an opportunity to leave at once, which he did within one hour of the time that he was interviewed. When last seen he was driving in the direction of the Iowa State line. The Medical Board, however, has information indicating that Richard has gone to the State of North Dakota. It is extremely unlikely that this man will return to the State of Minnesota to operate, but if he should be seen anywhere in the State of Minnesota, and in any way attempts to practice healing, the Medical Board respectfully asks that it be immediately notified by telephone or telegram at 524 Lowry Medical Arts Bldg., Saint Paul. Richard is a man forty to forty-five years of age; five feet eight inches in height and weighs about 140 pounds. He has a very sallow complexion and a small growth on the lower left eyelid. He is a clever talker, his ability along this line being proven by the following that he built up in such a short period of time at Myrtle. He is driving a Terraplane automobile with Minnesota license plates for 1934 B487-131. He is accompanied by two young women, one of whom he stated was his wife and the other his sister-in-law.

MINNESOTA STATE MEDICAL ASSOCIATION

Eighty-first Annual Meeting

Duluth

PROCEEDINGS OF THE HOUSE OF DELEGATES*

First Meeting, July 15, 1934

The meeting of the House of Delegates of the Eighty-first Annual Session of the Minnesota State Medical Association, held at the Hotel Duluth, Duluth, Minnesota, was called to order at seven thirty-five o'clock by President Savage.

Dr. Boleyn, Chairman of the Credentials Committee, reported thirty-four accredited delegates present, and there being a quorum present the meeting was declared officially open for the conduct of business.

Dr. Crockett of Lafayette, Indiana, and Mr. Crownhart, Executive Secretary of the Wisconsin Medical Society, were greeted as guests of the House of Delegates.

By consent of the House, the minutes of the previous meeting of the House of Delegates were approved as published in the September and October, 1933, issues of MINNESOTA MEDICINE.

President Savage presented his report.

Secretary Meyerding reported in detail on the routine business of the State Office and gave a résumé of the committee and Council activities for the year. Much of this material was covered in detail in subsequent reports.

The Report of the Treasurer was presented by Dr. Condit.

REPORT OF TREASURER

MINNESOTA STATE MEDICAL ASSOCIATION

STATEMENT OF CASH RECEIPTS AND DISBURSEMENTS FOR THE YEAR ENDED DECEMBER 31, 1933

CURRENT FUNDS	
Cash on hand December 31, 1932.....	\$ 7,211.71
CASH RECEIPTS, YEAR 1933	
Dues collected, 1933.....	\$29,764.75
Dues collected prior years.....	125.00
Dues collected in advance.....	420.00
Interest on daily balance.....	\$30,309.75
Interest on savings account.....	35.22
Bruce Publishing Co. due on 1932 contract MINNESOTA MEDICINE	317.30
Transferred from Technical Exhibit Fund for credit of Annual Meeting expense.....	660.94
	1,000.00
Total receipts.....	32,323.21
	\$39,534.92

CASH DISBURSEMENTS, YEAR 1933

Special Committees†	
Educational Fund†	\$ 9,683.90
Historical	392.93
Hospitals and Med. Education	16.58
Public Health Education.....	2,799.14
Radio	826.89
State Health Relations.....	173.91
Unbudgeted Committees.....	390.30
MINNESOTA MEDICINE.....	4,027.00
Refunds for overpayment of dues	26.00

*At the meeting of the Council February 24, 1934, it was voted to publish the Proceedings of the House of Delegates and the Committee reports in abbreviated form.

†This fund is higher during each Legislative Year.

Administrative Expenses:	
Annual Meeting.....	\$ 1,638.80
Conferences	1,454.02
Council expenses.....	377.94
County Officers' Meeting.....	386.10
Legal expense.....	50.00
Miscellaneous expenses.....	315.52
Office supplies and postage.....	521.57
Printed matter.....	403.66
Rent	300.00
Secretary's salary.....	4,200.00
Secretary's travel expenses.....	310.98
Stenographic service.....	1,849.04
Telephone and telegraph.....	366.64
Treasurer's salary and expenses	101.58
	12,275.85

Total disbursements.....	30,612.50
Cash on hand Dec. 31, 1933.....	\$ 8,922.42

It was moved by Dr. R. T. LaVake that the report be accepted; seconded and carried.

Dr. Workman presented the report of the Council, and moved its acceptance; seconded and carried.

REPORT OF THE COUNCIL

The Council of the Minnesota State Medical Association held its first meeting of the 81st Annual Session at the Hotel Duluth, Duluth, Minnesota, on Sunday, July 15, 1934, at 11 a. m.

The following were present:

F. J. Savage	G. A. Earl
H. M. Workman	J. M. Hayes
N. O. Pearce	W. W. Will
H. Z. Giffin	W. L. Burnap
L. L. Sogge	W. A. Coventry
J. S. Holbrook	E. A. Meyerding
W. H. Condit	

Guests: F. S. Crockett, Indiana, C. B. Drake, J. T. Christison, H. M. Johnson, Mr. F. M. Brist.

The meeting was called to order by the Chairman, H. M. Workman.

The reading of the minutes was dispensed with.

Dr. Coventry read the quarterly report of the Bruce Publishing Company. MOTION made by Dr. Earl, seconded by Dr. Giffin and carried that the report be accepted.

Dr. Giffin, Chairman of the Finance Committee, read the report of the Fiscal Agency account. MOTION made by Dr. Coventry, seconded by Dr. Savage and carried, that the report be received with the recommendation that for the next six months any new buying of bonds be Government bonds.

The Auditor's report was summarized by Dr. Coventry. MOTION made by Dr. Earl, seconded by Dr. Workman and carried that the Auditor's report be accepted. It was the wish of the Council that the auditing of the books of the Editing and Publishing Committee be done only at the request of the Finance Committee.

The Treasurer's report for 1934 to date was read. MOTION made by Dr. Will, seconded by Dr. Holbrook and carried that this report be accepted. The Annual

Report of the Treasurer should specify the banks in which funds are deposited.

MOTION made by Dr. Coventry, seconded by Dr. Earl that the report of budget expenditures be accepted and placed on file.

Dr. Coventry commented on the comparison report of paid membership.

The following applications for Affiliate Membership were approved:

Geo. D. Haggard, Minneapolis—Hennepin County.

Theodore Thordarson, Minneota—Lyon-Lincoln County.

P. E. Sheppard, Hutchinson—McLeod County.

Chas. W. Tinker, Stewart—McLeod County

Jas. M. Markoe, St. Paul—Ramsey County

C. P. Dolan, Worthington—Southwestern Minnesota.

MOTION made by Dr. Savage, seconded by Dr. Burnap and carried that the Committee on Industrial Relations be continued.

MOTION made by Dr. Burnap, seconded by Dr. Earl and carried that the Mayo Resolution be read by Dr. Sogge at the banquet on Tuesday evening.

Dr. R. M. Wilder, Chairman of the Committee on Diabetes, appeared before the Council relative to the publication and distribution of the booklet entitled "Diabetes, How to Make it Harmless." MOTION made by Dr. Savage, seconded by Dr. Coventry and carried that the dissemination of simplified information concerning diabetes meets with the approval of the Council.

The Secretary introduced Dr. F. S. Crockett of Indiana.

The meeting adjourned for lunch.

At 2:30 p. m. the Council re-convened.

The report of the Committee on Medico-Legal Affairs was discussed. MOTION made by Dr. Coventry, seconded by Dr. Pearce and carried that this question be deferred and efforts be made to have the Medical Protective Company pay the bills rendered against Dr. S. A. Weisman of Minneapolis.

MOTION made by Dr. Coventry, seconded by Dr. Will and carried that the report on Affiliate Membership be immediately referred to the Reference Committee for report to the House of Delegates this evening.

MOTION made by Dr. Coventry, seconded by Dr. Pearce and carried that the report of the Committee on Constitutions be received and referred to the Reference Committee to be brought before the House of Delegates at its first session.

MOTION made by Dr. Will, seconded and carried that the Committee on Deafness Prevention and Amelioration be continued for another year.

The report of the Committee on Medical History was accepted and referred to the Finance Committee.

Dr. Hayes made a brief summary of the report of the Committee to Contact the State Board of Control regarding Federal and State Emergency Medical Relief.

MOTION made by Dr. Savage, seconded by Dr. Earl and carried that the Council authorize the Secretary to employ an assistant.

Dr. Crockett told briefly the situation in Indiana concerning emergency medical relief.

MOTION made by Dr. Coventry, seconded by Dr. Sogge and carried that an Emergency Advisory Committee composed of five members of the Council, three of whom shall constitute a quorum, be appointed to advise with the Secretary in all emergency matters pertaining to the policies of the State Association.

MOTION made by Dr. Hayes, seconded and carried that the present Committee to Contact the State Board of Control regarding emergency medical relief be continued.

The Secretary was authorized to cut down the proceedings of the House of Delegates for publication.

MOTION made by Dr. Coventry, seconded by Dr. Earl and carried that the Committee on Medical Economics be given the highlights of the Council meetings for publication in MINNESOTA MEDICINE.

MOTION made by Dr. Hayes, seconded by Dr. Sogge and carried that the Council appoint a Committee on Economics consisting of five members, this Committee to appoint such sub-committees as it considered necessary to carry out its activities, with the approval of the Council.

NOMINATION of Dr. H. M. Johnson and W. F. Braasch as Delegates to the American Medical Association were accepted. Alternates, G. A. Earl and W. L. Burnap.

Refund of 1934 dues of E. C. Muir, formerly of Minneapolis, was approved.

Dr. A. W. Eckstein of Mankato is to be dropped from membership roll.

The Secretary was authorized to issue a charter to the Washington County Medical Society using the officers for 1902.

Resolution from the Steele County Medical Society was referred to Dr. R. E. Scammon of the Medical School.

Motion from the Renville County Medical Society to be referred to the delegate from the County concerned.

Dr. B. J. Branton reported on his study of malpractice insurance.

Motion made by Dr. Coventry, seconded and carried that the offer of an annual lectureship from the Minnesota Radiological Society be accepted.

Motion made by Dr. Coventry, seconded by Dr. Burnap and carried that the report of the Reference Committee be accepted.

The meeting adjourned.

The following Councilors reported that conditions were satisfactory in their respective districts:

Dr. H. Z. Giffin.....	First District
Dr. L. L. Sogge.....	Second District
Dr. H. M. Workman.....	Third District
Dr. J. S. Holbrook.....	Fourth District
Dr. G. A. Earl.....	Fifth District
Dr. J. M. Hayes.....	Sixth District

Dr. W. W. Will.....Seventh District
 Dr. W. L. Burnap.....Eighth District
 Dr. W. A. Coventry.....Ninth District

As Delegate to the A. M. A., Dr. H. M. Johnson reported on the action taken by the Delegates of the A. M. A. on the Report of the Medical Service Board of the American College of Surgeons.

Dr. W. F. Braasch reported as Delegate of the A. M. A. and moved the adoption of the following resolution:

"The House of Delegates of the Minnesota State Medical Association assembled heartily endorses the sentiments and principles expressed by the action taken at the recent meeting of the House of Delegates of the American Medical Association at Cleveland in which were clearly stated the fundamental principles which should govern the practice of medicine both now and in the future as formulated in the (1) Ten Points and (2) the resolution that the American Medical Association is the proper body to legislate for and control the forms of medical practice.

"We further approve the resolution passed by the House of Delegates of the American Medical Association condemning any attempt on the part of any scientific medical organization whose members are also members of the American Medical Association to dominate or control the nature of medical practice."

The motion to adopt this resolution was seconded by Dr. J. M. Hayes, and carried.

Dr. J. T. Christison also reported as a Delegate to the A. M. A.

Report of the Regional Conference was presented by Dr. W. F. Braasch.

Report of the Committee on Public Policy and Legislation was presented by Dr. H. M. Johnson, Chairman, who stated that in spite of the fact that at the last year's special session of the Legislature no bills affecting medical interest were to be taken up, it became necessary to devote much time to looking after legislation. One bill which may have unfortunate consequences was passed early in the session, but many others equally unwise did not pass. The Reference Committee recommended that this report be accepted and that action of the committee be commended.

Dr. Walter L. Bierring, President of the American Medical Association, briefly addressed the House of Delegates.

Dr. Boleyn presented a supplemental report of the Credentials Committee, stating there were now forty-six accredited members of the House of Delegates registered.

Dr. L. R. Critchfield, Chairman of the Committee, presented the following report of the Committee on Public Health Education: The Committee recommended that the following activities be stressed for the coming year: (1) an active public health education committee for every county society; (2) a program to enlist interest in public health programs of the family doctor; (3) statewide development of the Speakers' Bureau and college lecture courses; (4) encouragement of orthopedic clinics.

The weekly newspaper service conducted by the committee now reaches 570 papers; a total of 864 health talks was arranged through State Headquarters;

folders containing a list of the subjects on which material is available in the Speakers' Library were sent out to the entire membership; *Everybody's Health* was sent as in former years to all members of the State Legislature; for the third successive year, this committee coöperated with the Minnesota Public Health Association to examine 4-H club boys and girls from all over the state; the committee paid in part for the distribution of an attractive health manual for schools and also for the little health diaries awarded school children for buying Christmas seals, and for the first aid manuals which were again distributed this year: a reprint of the popular radio talk by Dr. O'Brien, "Patient and Physician" was sent out.

The Committee feels that the past year has witnessed unexampled activity on the part of its members.

The Reference Committee expressed itself as being in accord with the recommendations presented, and recommended that they be accepted; seconded by Dr. Boleyn and carried.

The Reference Committee moved that the Secretary's report be adopted, and that all acts, appointments and contacts made by the Council, the Secretary and the Treasurer for the past year be approved; seconded and carried.

The report of the Committee on State Health Relations was presented by Dr. T. H. Sweetser, Chairman, who said that considerable effort was made to solve the problem of the care of the indigent sick. The chairman alone or with officers of the State Association visited and discussed the problem in seven cities throughout the state and corresponded with officials of county societies elsewhere. The chairman and some members of the committee were drawn into meetings with other state medical association committees, with the State Board of Control and other agencies; also, the chairman attended most of the meetings of the State Board of Health and tried to present the Medical Association viewpoint in matters relating to immunization, tuberculosis control, health and sanitation in camps, and other health department projects.

Dr. Sweetser reported as follows, also for the Committee to Study Medical Care in Isolated Communities, that a careful investigation of reports that medical care was *not* available in certain communities showed doctors to be within easy reach of everybody in the state because of good roads and the automobile. The question rather was felt to be one of assisting these hard-pressed physicians to remain at their posts.

The following committees made reports, but in the absence of any new developments in their work, they are merely listed below:

The Committee on Laboratory and X-Ray Technicians

L. G. Rigler, M.D., Chairman

The Committee on Public Health Nursing

E. S. Boleyn, M.D., Chairman

The Committee on University Relations

L. L. Sogge, M.D., Chairman

The Editorial Association Committee

J. S. Reynolds, M.D., Chairman

The Editing and Publishing Committee reported as follows:

Despite the loss in advertising revenue and subscription receipts in MINNESOTA MEDICINE during 1933, expenses were reduced to a point where the journal paid its way, and, while conditions are not overly promising for 1934, they are such that there is hope for a substantial increase in volume for the year. If a larger advertising revenue is procured, it may be found possible to increase the size of the journal without additional cost to the State Association.

Radio Committee reported that fifty-nine radio talks were given over WCCO between April 5, 1933, and June 15, 1934, total programs being 324 to date. These talks were given by Dr. W. A. O'Brien, Associate Professor of Pathology and Preventive Medicine, University of Minnesota, and are published in abstract in *Everybody's Health*, the publication of the Minnesota Public Health Association.

Mail response is consistently good. An all-time station record for a morning broadcast was broken when 2,475 persons wrote in for a copy of the booklet "What Everyone Should Know about Cancer," which Dr. O'Brien discussed in a December program.

As a direct result of his radio contacts with the public, Dr. O'Brien has made ninety-four personal appearances during the year, speaking before some 14,000 people.

Seventeen hundred folders containing a general announcement of his program with his picture, and 8,900 copies of a booklet reprint of his talk called "Patient and Physician" were sent out to our members. We believe we are progressing in the education of the public.

It is significant to note that agencies placing advertising for patent medicines find Minnesota the poorest state in the Union for response to their appeals.

The Reference Committee commended the work of the Radio Committee, and in particular the time and effort put forth by Dr. O'Brien, and suggested that another effort be made to get an additional hour during the week over state KSTP. Also, the Reference Committee approved a resolution condemning the exploitation of drugs, remedies and so forth on the radio and recommended that it be brought to the attention of the Federal Radio Commission and remedial action undertaken; seconded by Dr. Boleyn and carried.

Report of the Committee on Hospitals and Medical Education was called for, but was not presented.

Dr. A. S. Hamilton reported for the Historical Committee that its compilations are not quite completed to date, but that it is their intention to present this material for the history of the association to the Council for publication before next year.

The recommendation of the Reference Committee was that this report be accepted and the recommendations received favorably; also that the profession throughout the state lend their assistance in the prosecution of this work, and that subscriptions to the publication should be widespread. Approved.

The Necrology Report was presented by Dr. A. S. Hamilton.

NECROLOGY REPORT

It has grown to be a custom to devote each year a moment to honoring the memory of those respected and beloved members of our Association whose spirits have passed on to the realm of eternity; some in the fullness of years and some whose race seemed hardly begun. In the activity of our professional duties we seem to lack time to manifest the true regard we feel for one another and we develop the habit of suppression that forbids us in life to say the kind words we really feel for one another.

It is the desire of your Historical Committee to express this sense of sorrow at the death of the many members whose names are here recorded and our sympathy with the relatives and friends who remain.

In Memoriam

May 20, 1933-June 30, 1934

- Harry Aldes, St. Paul. Born 1884. University of Illinois, 1911. Died March 21, 1934. Aged 51.
 Mason Allen, St. Paul. Born 1872. University of Minnesota, 1897. Died August 31, 1933. Aged 60.
 Wilson A. Allen, Rochester. Born 1834. Hahnemann Medical College, 1874. Died May 11, 1934. Aged 100.
 Hugh C. Arey, Excelsior. Born 1878. University of Minnesota, 1902. Died May 20, 1934. Aged 56.
 Knox Bacon. San Diego. Formerly of St. Paul. Born 1864. University of Minnesota, 1894. Died April 7, 1934. Aged 70.
 Frank E. Balcome, St. Paul. Born 1872. Eclectic Medical Institute, Cincinnati, 1899. Died Oct. 21, 1933. Aged 61.
 Robert Stewart Bole, St. Paul. Born 1860. University of Vermont, 1884. Died Sept. 16, 1933. Aged 73.
 Harold S. Boquist, Minneapolis. Born 1888. University of Minnesota, 1921. Died June 11, 1934. Aged 45.
 Mathias H. Cremer, Red Wing. Born 1870. Kentucky School of Medicine, 1891. Died May 26, 1934. Aged 64.
 Cyrus Bowers Eby, Spring Valley. Born 1872. University of Minnesota, 1892. Died Jan. 20, 1934. Aged 62.
 Ross M. Gamble, Albert Lea. Born 1896. University of Minnesota, 1922. Died May 5, 1934. Aged 38.
 David Graham, Duluth. Born 1859. Detroit College of Medicine, 1893. Died November 11, 1933. Aged 74.
 R. D. Graham, Duluth. Born 1884. Chicago College of Medicine and Surgery, 1915. Died December 26, 1933. Aged 49.
 Earle R. Hare, Minneapolis. Born 1872. University of Minnesota, 1900. Died April 7, 1934. Aged 61.
 Angell S. Holland, Minneapolis. Born 1884. University of Minnesota, 1910. Died February 22, 1934. Aged 49.
 Fred N. Hunt, Fairmont. Born 1857. Missouri Medical College, 1883. Died January 31, 1934. Aged 77.
 Helmer Walter Huseby, Floodwood. Born 1899. University of Minnesota, 1926. Died March 22, 1934. Aged 34.
 Hartland Cyrus Johnson, St. Paul. Born 1860. College of Physicians and Surgeons, Chicago, 1886. Died November 26, 1933. Aged 73.
 E. D. Keyes, Winona. Born 1859. Rush Medical College, 1885. Died May 21, 1934. Aged 75.
 Muret N. Leland, Minneapolis. Born 1874. College of Physicians and Surgeons, Chicago, 1896. Died May 28, 1934. Aged 60.
 John Dexter Lyon, Minneapolis. Born 1875. Northwestern University, 1904. Died May 29, 1933. Aged 58.
 Thomas E. McDermott, Minneapolis. Born 1857. Chicago Medical School, 1883. Died February 20, 1934. Aged 77.
 James McKeon, St. Paul. Born 1861. Physicians and Surgeons College, Minneapolis, 1889. Died July 5, 1933. Aged 71.
 Brewer Mattocks, St. Paul. Born 1841. St. Louis Medical College, 1864. Died February 25, 1934. Aged 93.
 C. P. Nelson, Owatonna. Born 1869. University of Michigan, 1896. Died July 14, 1933. Aged 64.
 Benjamin F. Simon, St. Paul. Born 1870. Rush Medical College, 1900. Died December 15, 1933. Aged 63.
 J. T. Smallwood, Worthington. Born 1882. University of Minnesota, 1908. Died May 24, 1933. Aged 52.
 Adolph Stierle, St. Paul. Born 1867. University of Minnesota, 1901. Died August 8, 1933. Aged 66.
 Harold L. Stolpestad, St. Paul. Born 1879. University of Minnesota, 1902. Died October 18, 1933. Aged 54.
 John O. Taft, Minneapolis. Born 1879. College of Physicians and Surgeons, Minneapolis, 1907. Died August 29, 1933. Aged 54.
 George S. Wattam, Warren. Born 1856. Victoria University, Coburg, Ontario, 1884. Died March 17, 1934. Aged 77.
 H. R. Weirich, Hibbing. Born 1872. Columbia University, 1896. Died October 29, 1933. Aged 61.
 Charles G. Weston, Miami. Formerly of Minneapolis. Born 1858. Harvard Medical School, 1882. Died March 2, 1934. Aged 76.

Edward H. Whitcomb, St. Paul. Born 1861. Columbus Medical College, 1884. Died June 8, 1933. Aged 72.

FORMER MEMBERS

Nels Andrew Biorn, Jackson. Born 1874. Minneapolis College of Physicians and Surgeons, 1901. Died February 4, 1934. Aged 59.

Andrew Jackson Gilkinson, Osakis. Born 1863. University of Minnesota, 1893. Died December 26, 1933. Aged 70.

E. E. Harrison, West Concord. Born 1866. University of Minnesota, 1897. Died June 11, 1934. Aged 68.

By virtue of their long and busy lives, two members of our Association seem to deserve special mention:

Dr. Wilson A. Allen died May 11, 1934, being then the oldest living active practitioner of medicine in the United States and having practiced the art of medicine seventy-eight years.

Dr. Brewer Mattocks entered the medical service in the Civil War at twenty years of age and died February 25, 1934. Though a graduate in pharmacy only, he succeeded in entering the medical service in 1861 and near the close of the war, as did many others, was given his diploma in medicine. During the last years of his life he was blind and was an inmate of the Minnesota Soldiers' Home for some years. He was a charter member of the State Medical Association at its reorganization in 1869.

A. S. HAMILTON, M.D., *Chairman*

The audience arose and stood in silence in memory of the deceased members.

The Heart Committee, of which Dr. F. J. Hirschboeck is Chairman, reported that they have availed themselves of the kind offer of MINNESOTA MEDICINE to supply space for articles prepared by members of the committee and that it is their purpose to have one short paper each month bearing on some phase of heart disease which will be of interest to the men in practice. The Reference Committee recommended the acceptance of the report. (Approved.)

The Committee of Medico-Legal Affairs, of which Dr. W. H. Hengstler is Chairman, reported a case which was brought to their attention in which a certain Minneapolis doctor, who believed himself fully covered, was denied the coöperation of his insurance company in a malpractice suit. In the light of this situation, the committee recommends that all members of the state association investigate carefully their medical protective policies, no matter in what company they are written, to be sure that they are fully protected. The Reference Committee reported concurrence in the recommendations of the committee as submitted in its report. (Approved.)

The report of the Committee on Industrial Relations, presented by Dr. J. M. Hayes, outlined the efforts that have been made by the committee to come to some satisfactory understanding with the representatives of the various Workmen's Compensation Insurance Companies, with the result that the adjustors have agreed not to sanction literature instructing the public that the employee has no right to choose his own physician. The Industrial Commission was also interviewed by the committee. The Commission has had few complaints from doctors and it has always advised payment of reasonable bills.

The Reference Committee recommended that the re-

port be accepted, and that the committee be given to understand the work they have done is thoroughly appreciated; seconded and carried.

The Committee on Military Affairs, Lieut. Col. W. G. Workman, M.D., Chairman, recommended that an active committee be appointed to urge the younger men in county societies to apply for appointment to the Medical Reserve; that the committee make a study to determine the advisability of re-establishing the Medical Department in the R. O. T. C. at the University; that the Council consider an endorsement of and an insistence on the retention of the R. O. T. C. as a whole at the University; that physicians having applied for commissions try to perfect themselves through correspondence courses so that they may advance in proficiency and rank; that membership in and support of the Minnesota Reserve Officers Association be encouraged.

The Reference Committee recommended that this report be referred back to the Committee on Military affairs, and that it would be inadvisable for the State Medical Association to take any action on the second or third recommendations of the report; seconded, and carried.

The Cancer Committee, Dr. Martin Nordland, Chairman, reported that, in an endeavor to arouse interest in the profession with reference to cancer, the committee is urging the institution in each county society in the state of the custom of devoting one meeting a year entirely to this subject. It is also planned that cancer shall receive a more prominent place in the State Meeting programs. Consequent improvement in the handling of cancer patients by the family physician is anticipated.

It was recommended by the Reference Committee that the Report of the Committee on Cancer be accepted.

An informal report of the Committee on Interprofessional Relationship, in which it was proposed that the work of the Committee could best be carried on within the membership and through several association agencies and committees, was presented by Dr. B. S. Adams, Chairman. The recommendation of the Reference Committee that this report be accepted was approved.

The report of the Committee on Diabetes was presented by Dr. R. M. Wilder, Chairman, who outlined arrangements for the exhibit on diabetes at the State Meeting. The exhibit was accompanied by talks by committee members. Dr. W. A. Stafne, also of the committee, read a paper on the rapid spread of the disease in Minnesota before a general session at the meeting. It is hoped by the Committee that these activities will arouse greater interest in the disease and consequent improvement in the handling of diabetic patients by their home doctors. He also explained the plan to publish and distribute to doctors for use of their patients the booklet "Diabetes, How To Make It Harmless."

The Reference Committee recommended the adoption of this report and its recommendations, and also suggested that Dr. Wilder prepare a statement or letter

to be sent to the individual county societies to be read or published in their bulletins as to the reason for the publication of the booklet on diabetes. It further recommended that Dr. O'Brien give a radio talk on diabetes and state that these pamphlets are available through the family physician; seconded and carried.

Dr. Horace Newhart, Chairman, presented the report of the Committee on Deafness Prevention and Amelioration, which showed definite progress during its first year of existence. Its activities include efforts to stimulate active interest among physicians, educators, and parent-teacher groups in the neglected problem of deafness prevention, the conservation of hearing, and the amelioration of the condition of those who have a handicapping hearing loss.

Surveys of pupils in teachers' college towns and a CWA project testing the hearing of 5,575 school children in rural Hennepin County have been conducted by the Committee. The work is chiefly directed to point out the needs of the school child and the importance of incorporating into the regular school health program the periodic testing of hearing with an audiometer.

The Reference Committee recommended that the report of this committee be accepted, feeling it is along the lines of public health education and cannot fail to enhance and increase the activities of the physician, and also tends to enhance and increase the activities of the profession along the lines of preventive medicine; seconded and carried.

The Committee on Medical Economics, represented by Dr. W. F. Braasch, Chairman, reported the establishment of a special department in MINNESOTA MEDICINE which should deal with such subjects in the current progress of medical economics of interest to State Association members. It is believed that by informing organized medicine thoroughly on economic matters, a powerful defense will be established against the inroads of socialization.

As a further report of this committee, Dr. J. C. Michael presented his findings with regard to group health and accident, annuity and life insurance, and prepayment hospital insurance. Dr. Michael reported that as to group annuities and group life insurance, those forms of insurance were not feasible for members of the Association and that prepayment hospital insurance was not looked upon very favorably by the profession. No recommendations were made.

On the question of malpractice insurance, Dr. A. F. Branton reported for the Committee that the rate on this form of insurance had been increased, as found from answers to questions on this matter sent to members of the profession in this state. This matter of rates was taken up with the insurance companies concerned, and from the data submitted to Dr. Branton as to the number of malpractice suits brought he felt the increase in premiums was justified. It was felt by Dr. Branton that the members should be thoroughly conversant with the laws governing medical practice, and that through that knowledge the number and size of verdicts could be materially reduced. He felt the members could become better practitioners through

taking postgraduate courses, and there would be less chance for malpractice suits being brought, and that instead of one member of the profession testifying against another member, the profession should unite behind the defendant of a suit where such action would not be unethical.

The recommendation, as presented by Dr. Branton, was that the action of any member of the State Association who testified against another member of this Association in good standing be submitted to investigation by the Committee on Ethics of his county society and that the member be subjected to censure or expulsion as the Council of the Minnesota State Medical Association might deem advisable.

Dr. Boyer discussed Dr. Branton's recommendation and stated that he objected to the move to censure anyone testifying against another member of the Association. He felt it would be better to investigate the justice of such testimony by a fellow member, and the conditions under which such testimony was given, since there were times when a person could not avoid appearing on the witness stand on the side opposite to that of his fellow practitioner.

This portion of the report by Dr. Branton was not formally before the Reference Committee, but Dr. Boyer, speaking for himself, recommended the acceptance of the report and suggested that the recommendation be referred back to the committee for further consideration.

Dr. Branton withdrew the recommendation, and the recommendation of Dr. Boyer to accept the report was seconded and carried.

The Committee on Limitation of Medical Licenses, presented by Dr. N. O. Pearce, Chairman, recommended that physicians be kept informed of the present over-saturated condition of medical practice and be urged to discourage young people from choosing a medical career; that the Administration of the University be continually informed of the conditions governing medical practice and its coöperation be invited to assist in promoting plans to curtail the number of new men and women entering practice; that if the legislative committee makes any attempt to change the present statute governing the State Board of Medical Examiners, it incorporate a clause giving the Board discretionary powers as to the number of physicians to be granted licenses; that, inasmuch as the ratio of physicians to population in Minnesota is now more than adequate, a figure not exceeding the present ratio be maintained. The number licensed each year since 1930 has decreased from 171 in 1930 to seventy-three in 1934.

The Committee also recommended that, since the present income of the State Board of Medical Examiners is inadequate, the Board endeavor to establish regulations requiring all physicians holding Minnesota licenses, regardless of present location, to register and pay the fee annually on penalty of having their licenses to practice revoked. This would either add materially to the funds of the Board or eliminate most of the 1,900 licenses now held by non-resident and non-registering physicians.

The Reference Committee recommended that the

fact-finding features of the report be accepted, and that the subject of limitations of number of physicians to be licensed in Minnesota be referred back to the committee for further study and that they confer with the Committee on University Relations and the Committee on Public Policy and Legislation, and report back next year; seconded and carried.

The Committee on Contract Practice, of which Dr. S. M. White is Chairman, reported that a scheme to establish contract practice in a group of school teachers was circumvented by officers of the committee who interviewed outstanding school superintendents and pointed out to them the undesirability of the arrangements proposed.

The report of the Committee on Federal and State Medical Relief was presented by Dr. J. M. Hayes and Dr. N. O. Pearce, Chairman. High lights of this exhaustive report follow.

REPORT OF COMMITTEE ON FEDERAL AND STATE MEDICAL RELIEF

"It is probable that the initiation and development of medical relief programs throughout the country has been one of the most significant developments in the practice of medicine.

"The results will be more far-reaching than any of us at the present time can foresee.

"It is entirely possible that the performance of the members of the medical profession during this present economic situation will determine whether government officials and the public will ultimately regard physicians as self-seeking opportunists or as humanitarians, working wholeheartedly with the government in its program for the amelioration of the condition of the poor."

DIVISIONS OF THE MEDICAL RELIEF PROGRAM IN MINNESOTA

1. Medical care in the Civilian Conservation Corps (Cared for by Army Physicians)
2. Child health recovery (Not developed so far as physicians were concerned. Many thousands of children were inspected by C. W. A. nurses made available to the Minnesota Child Hygiene Division.)
3. Civil Works Program (Medical care divided among local physicians except in Minneapolis, St. Paul, Duluth. Physicians received total of \$34,964.17; Clinics, \$861.65; Hospitals, \$13,647.79; Nurses, \$1,354.26. Now discontinued.)
4. Work Relief Program (Succeeded CWA. Government no longer responsible for Workmen's Compensation or for care of injured employees. Responsibility returned to local authorities. Families of workers eligible, however, for emergency medical, nursing, dental services the same as families on direct relief.)
5. Safety Division SERA (Small, little known, group; maintains a safety inspector in each county who inspects working conditions; supervises care of injured; personnel:

8 doctors, paid \$160 a month expenses each
8 nurses
1 technician
2 stenographers
2 clerks)

6. Medical Care of Transients in Relief Camps (In outlying camps care furnished by local physicians and hospitals; physicians paid according to direct relief schedule; hospitals at \$1.20 daily rate.

Federal funds finance it.

At Camp Mendota a medical unit is maintained of 2 physicians at \$165 and \$150 per month, 2 dentists \$165 and \$125 per month.)

7. Direct Relief in the Homes

Controlled by Rules and Regulations No. 7 FERA Bulletin (and SERA) dated Nov. 13, 1933.

Funds provided for "medical care in the home," medicines, nursing, dental care. No limitation placed on percentage of relief funds to be expended for the purpose. No funds to be used for hospitalization or for duplication of all already existing institutions for care of the poor.

Spent in Minnesota up to and including March, 1934, under this plan:

\$46,818.38 (exclusive of Hennepin, Ramsey, St. Louis)

Spent for total direct relief in the home same period \$3,178,553.57

(Original report gives complete monthly figures for each county.)

Omitting Hennepin, Ramsey and St. Louis, medical care expense is about 1.3 per cent of the total. In St. Louis County, physicians received about 3.1 per cent of the total relief expenditure.

PRESENT PLAN NOT ENTIRELY SATISFACTORY

Mr. Benjamin E. Youngdahl, Director, Division of Social Service, SERA. (Relief in the Home)

1. There are difficulties in equitable administration
2. Service is not uniform in all counties
3. Some doctors have attempted to use the program for their personal benefit
4. Some members of the relief administration are inclined to believe that they could give several times as much service by the employment of full-time or part-time doctors on a salary basis.

CONCLUSIONS AND SUGGESTIONS

1. Child Health Recovery Program: Of minor importance except as it shows tendency to designate examinations made by nurses as "inspections," a term under which any sort of irregular clinic may be held. The line of limitation of the diagnostic activities of the nurse should be sharply drawn and maintained.

2. Medical phases of the CWA were carried out in a satisfactory manner in the main. We question the necessity of setting up government clinics in the three large cities, however.

3. Work Relief Program. Physician should come to a satisfactory arrangement with local authorities for this work.

4. Medical Care in Transient Camps makes an un-

favorable impression so far as the salary schedule for physicians goes. This may be noted as a sample of what we may expect if the time ever comes when we have medicine under lay control.

5. SERA activities (most important of all, so far as the medical profession is concerned).

"As a profession it is our duty to care for those who are in need of our services regardless of their ability to pay. To the great honor of the medical profession, this duty has always been and always will be fully met. Because of present conditions and the general decrease in physicians' incomes, which, in many cases, scarcely provide for expense and maintenance, the federal government has made available to physicians certain allowances while caring for our temporarily indigent patients. We should accept this money from the government in no sense as a *professional fee for medical services rendered* but simply as a temporary plan of allowance for expense and maintenance. We must guard against any employer-employee relationship with these lay bodies which are administering relief.

"We should conduct ourselves in participating in this program in such a manner as to maintain the best principles of unselfish service in order to retain the respect of those with whom we are working. We must do this regardless of any temporary sacrifices entailed, rather than become entangled in, or have thrust upon us, plans for cheap medical service through schemes of SERA clinics or hiring medical men for this service—proposals which are undoubtedly being considered by some relief workers."

It has been suggested that the operation of the present plan would be greatly facilitated if a competent medical man were directing this phase of the program. Such a person might be employed by the SERA. It is also suggested that the State Medical Association employ an assistant to Dr. Meyerding who would devote his full time to aiding the SERA in carrying out the medical phase of the program. The situation requires more attention than is possible under our present set-up.

It is also suggested that, with the approval of SERA officials, the president of each constituent medical society be urged to appoint a committee of three in each county to confer with the Local Relief Committee in all matters pertaining to Medical Relief.

"It is possible that we are on the brink of some form of federal supervision of medical practice. It is therefore of the utmost importance that the medical profession meet the demands of our present financial dilemma in such an efficient and unselfish manner that no grounds may be found either for federal or state interference with our present method of medical practice."

The Reference Committee moved that these reports be accepted and such recommendations as they contain be concurred in; seconded and carried.

Dr. L. L. Sogge, Chairman, reporting for the Committee on Affiliate Membership, said that there is a definite feeling in some of the county societies that the age limit for affiliate membership should be reduced from seventy years to sixty-five years. But the committee recommends that the following information be

placed before the House of Delegates with the recommendation that a year's study be put upon the question before final decision; that this information and any additional information which may be obtained be presented to each county society for their discussion during the year; that affiliate membership should be regarded by the membership of the association as an honorary membership and that the dissemination of this sentiment is most important and that the question of age limit is a secondary consideration.

The widespread granting of affiliate membership would definitely reduce the income of the State Association and might necessitate an increase in the dues if the present standard of work or service is to be continued. At present, there are seventy-seven affiliate members, representing a reduction in income of \$1,155.00. There are forty-two members who are eligible to affiliate membership at age seventy, representing a possible reduction in income of \$630.00. There are 53 additional members who are at present between the ages of 65 and 69, representing a possible reduction in income of \$795.00 within the next five years.

In other words, the income of the society is at present reduced by the affiliate membership \$1,155.00. If all the members now over sixty-five apply for affiliate membership the income of the society would be reduced by an additional amount of \$1,425.00, making a total of \$2,580.00. This would be slightly reduced by the cost to the Association of MINNESOTA MEDICINE. It can easily be seen from these figures that the income of the Association over a period of years would be very definitely affected and might necessitate an increase in the dues of active members.

It was moved by Dr. Griffin, seconded and carried that this report be again presented at a subsequent meeting of the House of Delegates.

It was moved by Dr. C. L. Scofield, seconded and carried that the following charters be granted:

Olmsted-Houston-Fillmore-Dodge County Medical Society

Kandiyohi-Swift-Meeker County Medical Society

Renville County Medical Society

Washington County Medical Society

It was moved by Dr. J. M. Hayes, seconded and carried that Dr. J. W. Livingstone of Hudson, Wisconsin, be accepted as Associate Member in the Association.

On motion of Dr. W. F. Braasch, duly seconded, it was voted to accept the offer of the Minnesota Radiological Society to establish the Russell D. Carman Lectureship.

Dr. A. A. Passer of Olivia read a letter written by the secretary of the Renville County Medical Society concerning a motion adopted at their meeting, about malpractice cases. The State Secretary was to be asked to get in touch with the various insurance companies and organize some form of medical defense. It was also the wish of the Society that this subject be discussed at the meeting of the House of Delegates.

It was moved by Dr. C. L. Scofield that this matter be referred to the Medico-Legal Committee and have them report to the Council; seconded by Dr. Boleyn and carried.

It was moved by Dr. Scofield, seconded and carried, that meeting adjourn until one o'clock Monday afternoon.

Adjourned at eleven forty-five o'clock.

HOUSE OF DELEGATES

Monday, July 16, 1934

A special meeting was called to hear Dr. Walter L. Bierring, President of the American Medical Association, Dr. F. S. Crockett of Indiana, and Mr. J. G. Crownhart, Secretary of the State Medical Society of Wisconsin, on the questions relating to social insurance and medical relief.

HOUSE OF DELEGATES

Tuesday Afternoon, July 17, 1934

The meeting was called to order at 1:10 o'clock by President Savage.

Secretary Meyerding announced that according to the roll call fifty-one delegates were present.

Dr. Boleyn, presenting the final report of the Credentials Committee, reported fifty-one delegates had presented their credentials.

The minutes of the previous meeting were read by Secretary Meyerding, and on motion of Dr. Sogge, regularly seconded, it was voted to approve the minutes as read.

The report of the Council was read by Secretary Meyerding:

REPORT OF THE COUNCIL

The Council of the Minnesota State Medical Association held its second meeting of the 81st Annual Session, at the Hotel Duluth, Duluth, on Monday, July 16. Dinner was served at 5:30 P. M.

The following were present:

F. J. Savage	G. A. Earl
H. M. Workman	W. W. Will
H. Z. Giffin	W. L. Burnap
L. L. Sogge	W. A. Coventry
J. S. Holbrook	E. A. Meyerding

Guests: S. H. Boyer, Mr. F. M. Brist

The meeting was called to order by the Chairman, Dr. Workman.

The reading of the minutes was dispensed with.

Dr. Savage summarized a report received from the University of Minnesota relative to the amount earned by the University Staff for private work. **MOTION** made by Dr. Savage, seconded and carried that this matter be referred to the Committee on University Relations for report and the papers be filed in the Secretary's Office.

MOTION made by Dr. Giffin that the Committee on University Relations consider the advisability of requesting Dr. R. E. Scammon of the Medical School to establish, as a permanent feature, a series of lectures on medical organization as part of the instruction in the senior year. Seconded by Dr. Burnap and carried.

Mr. Brist outlined the situation at the South St. Paul Stockyards with reference to veterinarian examination. **MOTION** made by Dr. Burnap, seconded by Dr. Giffin and carried that this matter be left in the hands of the Medico-Legal Affairs Committee.

A discussion on malpractice cases followed. It was

the sense of the Council that Dr. Burnap submit a questionnaire which will be sent to each Councilor for criticism. Mr. Brist to make any suggestions he considers advisable.

The Councilor Districts were redistricted to conform with the County Medical Societies. **MOTION** made by Dr. Coventry, seconded by Dr. Will and carried that the Secretary write to the members in Koochiching County asking if they would prefer to transfer to St. Louis County Medical Society or remain in the Upper Mississippi Medical Society. A copy of this letter is to be sent to Dr. Coventry, as Councilor, for his approval.

The Secretary reported on the replies received from local Secretaries concerning indigent physicians.

Dr. Horace Newhart requested permission to increase his Committee by two members, one to be Dr. F. E. Harrington of Minneapolis and, as an ex-officio member, Mr. Leonard M. Elstad, Supt. of the State School for the Deaf, Faribault. Dr. Harrington was accepted but Dr. Newhart will be advised that Mr. Elstad shall act in an advisory capacity only.

Dr. Giffin reported for the Finance Committee relative to the employing of a Field Representative for the State Association. **MOTION** was made, seconded and carried that the Association enter into an agreement to employ said representative for one year.

The meeting adjourned and re-convened at 9 o'clock with representatives from the Emergency Relief Administration. The program of medical relief was discussed. **MOTION** made by Dr. Pearce, seconded by Dr. Burnap and carried that it was the sense of the meeting that Mr. Edmonds and Mr. Youngdahl indicated a great spirit of coöperation in this work.

The meeting adjourned.

On motion of Dr. Scofield, it was regularly seconded and carried to adopt the redistricting of the Councilor Districts as outlined in the report. The Councilor districts as now constituted are as follows:

District 1.—Dodge, Fillmore, Freeborn, Goodhue, Houston, Mower, Olmsted, Rice, Steele, Wabasha, Winona

District 2.—Cottonwood, Faribault, Jackson, Martin, Murray, Nobles, Pipestone, Rock, Watonwan

District 3.—Big Stone, Brown, Chippewa, Kandiyohi, Lac Qui Parle, Lincoln, Lyon, Meeker, Popc, Redwood, Stevens, Swift, Traverse, Yellow Medicine

District 4.—Blue Earth, Carver, Le Sueur, McLeod, Nicollet, Renville, Scott, Sibley, Waseca.

District 5.—Anoka, Chisago, Dakota, Isanti, Kanabec, Mille Lacs, Pine, Ramsey, Sherburne, Washington

District 6.—Hennepin, Wright

District 7.—Aitkin, Beltrami, Benton, Cass, Clearwater, Crow Wing, Hubbard, Morrison, Koochiching, Stearns, Todd, Wadena

District 8.—Becker, Clay, Douglas, Grant, Kittson, Lake of the Woods, Mahanomen, Marshall, Norman, Otter Tail, Pennington, Polk, Red Lake, Roseau, Wilkin

District 9.—Carlton, Cook, Itasca, Lake, St. Louis

Dr. Giffin gave a résumé of the work of the proposed field representative and the qualifications of the man with whom negotiations were made to carry on

this work. Following general discussion of this matter, it was voted to confirm the action of the Council in entering into an agreement with the proposed said field representative.

The report of the Council was accepted.

Dr. Boyer reported on the meeting of the Council with representatives from the Emergency Relief Administration, and general discussion ensued on this topic.

Secretary Meyerding brought out the fact that all Councilors should be notified of Medical Society meetings in their respective districts.

The following officers were nominated and elected:

President.....W. A. Coventry, Duluth
First Vice President....A. G. Chadbourn, Heron Lake
Second Vice President.....E. S. Boleyn, Stillwater
Secretary.....E. A. Meyerding, Saint Paul
Treasurer.....W. H. Condit, Minneapolis
Councilors:

Third District.....H. M. Workman, Tracy (3 years)
Fifth District.....G. A. Earl, Saint Paul (3 years)
Seventh District.....W. W. Will, Bertha (3 years)
Ninth District.....B. S. Adams, Hibbing (For the remainder of the unexpired term)

Delegates to the American Medical Association:

Delegates

Alternates

H. M. Johnson, Dawson G. A. Earl, Saint Paul
W. F. Braasch, Rochester W. L. Burnap, Fergus Falls
Elected for term of two years beginning January 1, 1935.

On motion of Dr. Adams, regularly seconded, it was voted to ratify the action of the Council in electing as Delegate and Alternate to the American Medical Association Drs. J. T. Christison and E. A. Meyerding, respectively, to fill the unexpired terms.

The special Committee on Constitutions, Dr. W. H. Hengstler, Chairman, reported the formulation of two sample "model" constitutions, one for smaller societies, and one for societies in larger communities. The committee recommended that each county society study its present constitution in the light of these samples. The committee will continue its work and final recommendations will wait for the model now under preparation by the American Medical Association.

Reporting for the Reference Committee, Dr. Boyer recommended that the report be accepted, together with its recommendations; seconded and carried.

The amendment to the State Association Constitution which was introduced by the Ramsey County delegation was carefully considered by the Reference Committee, and its recommendation is that this amendment be referred to the State Committee on Constitution and By-Laws without recommendation, to be reported on at the next meeting; seconded, and carried.

The report of the Committee on Affiliate Membership was discussed, and Dr. Hultkrans made a motion that the recommendation of the Council committee considering the question of affiliate membership be accepted; regularly seconded and carried.

It was moved by Dr. Scofield, regularly seconded and carried, that the next meeting of the Minnesota State Medical Association be held in Minneapolis, the date to be set by the Council.

President Savage appointed Drs. Locken and Haney as a committee to present the President-Elect at the presentation of officers Wednesday.

Dr. Thabes read a proposal for statewide tuberculosis work by the State Board of Health, which was approved by the House of Delegates.

Dr. Magney made a statement concerning the State Board of Medical Examiners and its financial status. It was moved by Dr. Slater, regularly seconded and carried that the matter of the shortage of funds, and the report of the State Board of Medical Examiners be referred to the Council with power to instruct their Legislative Committee to act.

President Savage appointed Dr. Hagen, Dr. Liedloff and Dr. Locken as a committee to present resolutions of thanks to the St. Louis County Medical Society, the Hotel Duluth, the Duluth Association, the Duluth papers, the photographers and radio stations.

Motion was regularly made, seconded and carried, to adjourn at three-thirty o'clock.

OBITUARY

Erle Edson Benedict 1877-1934

Dr. E. E. Benedict, practicing physician in Minneapolis for the past twenty-five years, died September 13, 1934.

Born at Osage, Iowa, Dr. Benedict studied medicine at the University of Minnesota, and later continued in the post graduate school at Johns Hopkins university. Dr. Benedict practiced medicine at Racine, Minn., five years before moving to Minneapolis.

Dr. Benedict was a member of the Hennepin County Medical Society, the Minnesota State Medical Association and the American Medical Association. He was an examiner for the Metropolitan and Reliance Life Insurance Companies, and the Royal Neighbors and Modern Woodmen.

Surviving Dr. Benedict are his wife; three daughters, Mrs. Ed. Ukkleberg, Wahpeton, N. D., Mrs. Gale Rutherford, Chicago, Ill., and Dorothy Benedict, Minneapolis; and his mother, Mrs. A. E. Benedict, also of Minneapolis.

Jared W. Daniels 1867-1934

Dr. Jared W. Daniels, all his life a resident of St. Peter, Minnesota, and one of its outstanding citizens, died at his home Tuesday, October 9, of coronary occlusion, at the age of sixty-seven.

Born at St. Peter, March 15, 1867, the son of Dr. Asa W. Daniels, who came to Minnesota in 1853, he obtained his early education in the grade and high schools of St. Peter.

After attending the department of Arts and Sciences at the University of Minnesota and teaching school for a year, Dr. Daniels graduated from Rush Medical College in 1889 and spent a year at the College of Physicians and Surgeons in New York City. After three years' association with his father in practice he took a year of postgraduate study at St. Thomas Hospital at the London Post-Graduate School of Medicine and then returned to St. Peter well equipped to practice.

Dr. Daniels enlisted April 23, 1917, as a first lieutenant in the Army and received his captaincy at Fort Riley. He was later assigned to Whipple Barracks, Arizona. Following the war he was active in the American Legion, having been the Post Commander of the William R. Witty post in 1932.

For forty-four years Dr. Daniels was a warden and vestryman of the Episcopal church. He was a member of the Nicollet-LeSueur County Medical Society, Minnesota State and American Medical Associations, the Military Surgeons and Southern Minnesota Medical Association.

In 1904 Dr. Daniels married Florence A. Amundson, who survives him. One daughter, Isabel, is teaching at Howard, South Dakota, and the other, Karen, at Mahanomi, Minnesota. A sister, Mrs. J. V. Dodd, resides at Pomona, California.

E. W. Hammes 1854-1934

Dr. E. W. Hammes, who practiced medicine for forty-six years in the New Trier and Hampton communities in Dakota County, died in St. Joseph's hospital October 3, 1934, at the age of eighty years.

Dr. Hammes was born in Milwaukee, graduated from the Rush Medical college at Chicago in 1879 and a year later married Miss Anna Schmidt of Rolling Stone and established himself at New Trier for the practice of his profession. Later he moved to Hampton and continued in active practice until about eight years ago, when he moved to Saint Paul.

His widow and three children survive. They are Dr. E. M. Hammes, Miss Theresa Hammes and Mrs. Albert Muellerleile, all of Saint Paul.

Jacob L. Schoch 1862-1934

Dr. Jacob L. Schoch, well known physician of New Ulm, Minnesota, succumbed September 21, 1934, to pulmonary thrombosis and pleurisy following an operation.

Dr. Schoch was born at Selinsgrove, Pennsylvania, in 1862. He attended the schools in his native town and at Gettysburg, Pennsylvania, and was graduated in medicine at the University of Michigan at Ann Arbor, in 1885.

Dr. Schoch located at New Ulm, Minnesota, in 1888, and had since resided there as a practicing physician until his death.

In addition to conducting his medical practice, Dr. Schoch took an active interest in the establishment and development of various local industries and projects. He was appointed a member of the State Board of Medical Examiners by Governor Merriam, serving six years on that board. He was also a member of the pension examining board in former years. He was a member of the Redwood-Brown, Minnesota Valley and Minnesota State Medical Associations.

It is an interesting coincidence that the late Drs. O. C. Strickler and L. A. Fritsche, and Dr. J. C. Rothenburg of Springfield and the latter's associate, Dr. J. Shrader, who were all fellow students and graduated at the same time at the University of Ann Arbor, Michigan, eventually located in Brown County, Minnesota.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

Mayo Foundation Lectures

A special program of lectures and demonstrations in medicine will be held under the direction of The Mayo Foundation from December 3 to 7, inclusive. Mornings will be devoted to surgery and dry clinics. In the afternoons and evenings medical and surgical subjects, including cardiovascular diseases, diseases of the nervous system, artificial fever, roentgen and radium therapy, laryngology, oral and plastic surgery, gynecology, diseases of the endocrine glands and orthopedics, will be discussed.

While this program is arranged primarily for the Fellows of The Mayo Foundation, visiting physicians are invited to attend.

John W. Bell Tuberculosis Lecture

Leaders in tuberculosis work from Minnesota and the Northwest will attend the first annual John W. Bell Tuberculosis Lecture before members of the Hennepin County Medical Society at their evening meeting December 3. Dr. Gerald B. Webb, of Colorado Springs, former president of the National Tuberculosis Association and widely known for his work in tuberculosis, will be the speaker of the occasion.

The lectureship, established in the Hennepin County Medical Society last May, will bring to Minneapolis each year news of the most advanced methods of diagnosis and treatment in tuberculosis. It was founded by the Hennepin County Tuberculosis Association in honor of the late Dr. John W. Bell, of Minneapolis, with the approval of the Executive Committee of the Hennepin County Medical Society.

Dr. Webb, who was named by a committee of representatives from the Hennepin County Medical Society and the Hennepin County Tuberculosis Association, is research director for the Colorado Foundation for Research in Tuberculosis and he is president of the Colorado School for Tuberculosis.

Dr. N. O. Pearce is chairman of the committee on arrangements for the first annual lectureship. Members of his committee are Dr. George D. Head, Dr. J. F. Corbett, Dr. Thomas S. Roberts and Dr. H. L. Ulrich.

On the lectureship program will be Dr. J. F. Corbett, a close friend of the late Dr. Bell, who will give a tribute to the man in whose honor the lectureship was established. Dr. Thomas S. Roberts will discuss the part taken by Dr. Bell and others in the founding of the Hennepin County Tuberculosis Association.

Clay-Becker County

The Clay-Becker County Medical Society held a dinner meeting at Lake Park, November 2.

The program included a talk by Dr. J. A. Myers, Minneapolis, on "Chests"; Dr. H. S. Diehl, University of Minnesota, on "New Work on Colds, Treatment, et cetera"; and Dr. R. V. Ellis, University of Minnesota, on "Hay Fever."

Physicians from Fargo and all adjacent counties were invited to attend the meeting.

Lyon-Lincoln County

The following officers have been elected for the Lyon-Lincoln County Medical Society: Dr. L. J. Happe, Marshall, president; Dr. H. J. Nilson, Tracy, vice president; Dr. H. M. Workman, Tracy, secretary-treasurer; Dr. A. L. Vadheim, Tyler, delegate; Dr. B. C. Ford, Marshall, alternate; Dr. P. E. Hermanson, Hendricks, censor for three years.

St. Louis County

Dr. W. R. Bagley, Duluth, was elected president of the St. Louis County Medical Society at the society's annual meeting on October 11.

Other officers are Dr. E. N. Peterson, Eveleth, vice president; Dr. P. S. Rudie, Duluth, second vice president; Dr. M. G. Gillespie, Duluth, secretary-treasurer; Dr. L. R. Gowan, Duluth, Dr. R. L. Nelson and Dr. C. E. Alexander, Duluth, censors; Dr. C. L. Haney, Duluth, Dr. F. J. Elias, Duluth, Dr. B. F. Davis, Duluth, and Dr. G. T. Ayres, Duluth, delegates.

Southwestern Minnesota

The Southwestern Minnesota Medical Society met at Southwestern Sanatorium at Worthington, Friday, October 19, at 7 p. m.

Speakers were Dr. E. A. Meyerding, St. Paul, Secretary of the Minnesota State Medical Association, on "What Will Tomorrow Bring?" Dr. F. J. Savage, St. Paul, President of the Minnesota State Medical Association on "The Work of the State Society"; Dr. Henry Meyerding, Rochester, on "Fractures"; Dr. C. B. Wright, Minneapolis, on "Coronary Thrombosis"; and Dr. J. A. Myers, Minneapolis, on "Chests."

WOMAN'S AUXILIARY

President—MRS. MARTIN NORDLAND, Minneapolis

Editor—MRS. C. F. EWING, Wheaton

MEDICAL RELIEF*

GEORGE B. LARSON

Saint Paul

As you know, I have been employed by the Medical Association as their Field Representative with the particular assignment at the present time to work on Relief and SERA Compensation.

With the fast changing phases of the practice of medicine, there is need for someone to keep members posted on the changes that are being made every day. Unless a member is posted on the changes and educated to the routine of the new system of practice, he will suffer financially.

The practice of medicine is in a transitory stage. We are being regimented more and more each day. As an evidence of this regimentation we have the Relief Compensation. Beyond a doubt during the next session of Congress some type of Health Insurance will be worked on and, if passed, will regiment the profession far more.

The physician has lost in a measure some of his individualism, and as time goes on will lose more and more of it. Unless the medical profession exerts a guiding hand in the form of the new set-up, the ideals of the practice of medicine will be shoved aside and the doctor and the patient will become merely cogs in the wheels of "Machine Medicine."

Let us go back to see what has caused this present, we might say, drastic change in the practice of medicine. This change has been in the offing for a number of years, but the failure of business to maintain purchasing power of the general public has accentuated this change.

At the time of the presidential election there were long bread lines and soup kitchens. The burden in caring for these people became too great for the voluntary charitable institutions. Then it became too great for the local government and consequently it was shifted to the Federal government.

The American people demanded a change regardless of its nature; the election results were the expression of the American people in demanding more adequate relief to be furnished by the Federal Government.

As a result of this demand, we have had set up all the alphabetic bureaus with which you are more or less familiar. The bureau that affected us most directly is the FERA; this bureau provides medical care for those on relief.

Now, that you may appreciate the magnitude of this relief question, let me quote you a few figures:

National.—Spending \$100,000,000 monthly—5,000,000 families on relief; 10,000,000 unemployed; 25,000,000 to

*Address given before the Woman's Auxiliary of the Minnesota State Medical Association, October 10, 1934, Saint Paul.

40,000,000 families expected to be on relief before the winter is over.

Minnesota.—75,000 families on relief, which means 300,000 individuals; expected load 500,000.

You can readily see from these figures that the relief clients are going to constitute more and more the physician's private practice. It is important, therefore, that the physician become more closely organized . . . if he insists on continuing to play the game as an individualist, he is going to be sunk.

I realize that this is a rather lengthy preamble to the explanation of why I am here, but I did want to impress upon you the magnitude of this situation so that you might realize the importance it is going to play in the lives of the physicians, and appreciate the need for a field representative to educate and organize the profession for the impending changes to take place in the practice of medicine.

My duties this first month have been centered largely on the organization of an advisory and contact committee to work with the relief department. This same type of organization work is being carried on all over the United States, particularly in those states where they have an active state organization.

This organization under relief is really the golden opportunity for which organization men have prayed for years. As a result of this organization, we will be able to influence and guide whatever changes may come up.

I would like to explain to you just what these committees are doing, not only in Minnesota, but nationally. In the first place, they are advisory; they act on controversial bills. They are to be the police organization within the medical profession to guide the relief worker in medical work.

SERA has just recently provided compensation insurance for men on work relief projects and for the Administration employees of SERA. This has a great medical aspect inasmuch as medical care is one of the important provisions of this compensation insurance. I mention this only to show how governmental action is continuously encroaching on the private practice of the physician.

I have covered briefly what my duties consist of and the work I am doing.

There are just three important points I wish to impress upon you:

1. The importance of medical relief
2. The necessity of solid organization
3. The importance of the Auxiliary in this work
 - (a) Keep husbands sold on the organization
 - (b) Sell the nonmember's wife on the need for organization
 - (c) If you have a woman relief worker, entertain her.

Of General Interest

Dr. Stewart W. Shimonek has opened an office at 317 Lowry Medical Arts Building, Saint Paul, for the practice of orthopedics.

Dr. Bernard A. Flesche, a graduate of the University of Minnesota, 1933, who has been doing locum tenens work in several different localities in Minnesota, has located at Lake City, Minnesota.

Dr. W. D. Graham has moved from Cass Lake, Minnesota, to Neodesha, Kansas, where he is affiliated with CCC Company 784.

Dr. R. F. Hedin of Red Wing was recently elected the first president of the newly organized Junior Chamber of Commerce of Red Wing.

Mr. George B. Larson, field representative for medical relief of the Minnesota State Medical Association, talked to the Rice County Medical Society Friday evening, October 26, at the Faribault Clinic rooms. His subject was "Medical Relief."

Dr. A. T. Laird and staff of Nopeming Sanatorium were hosts, October 23, to an informal group of St. Louis County physicians interested in the industrial aspects of silicosis. The subject was fully outlined and ably visualized by x-ray films and tissue specimens.

Dr. Anderson Hilding of Duluth, who spent part of the last winter as an assistant in the eye clinic of the noted English missionary physician, Dr. Holland, in India, has recently given a series of enlightening illustrated addresses dealing with this work. He also attained the Khyber Pass and photographed a series of its menacing and observing citizenry at the very border of Baluchistan.

Physicians of the seven Minnesota counties in the Deerwood Sanatorium district have been invited to attend a short course on tuberculosis to be held at the sanatorium Friday, October 26, under the auspices of the Minnesota Public Health Association. Registration will be limited to a small group. The program will begin at 4 p. m., when physicians will have an opportunity to examine patients and discuss cases with the visiting clinicians. Dinner will be served at the sanatorium. Included on the evening's program will be lectures by Dr. S. A. Slater, superintendent of Southwestern Minnesota Sanatorium and former president of the Southwestern Minnesota Medical Society; Dr. J. A. Myers, Professor of Preventive Medicine, University of Minnesota; Dr. F. F. Callahan, superintendent of Pokegama Sanatorium; Dr. E. A. Meyerding, executive secretary of the Minnesota Public Health Association, and a demonstration by Dr. E. G. Hubin, superintendent of Deerwood Sanatorium.

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TREATMENT OF CARCINOMA OF THE BREAST*

Combined Surgical And Irradiation Treatment

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St. Paul, Minn.

IN trying to evaluate properly the results obtained by either surgery or irradiation alone, and then again by the combined surgical and ray treatment, we encounter many difficulties. Some of the most prominent surgeons ten years ago declared that the statistical survey of their operative cases showed no improvement by the addition of postoperative irradiation. That this attitude was not correct is generally conceded today, when very competent observers report cases apparently cured by irradiation alone. The danger for progress lies to some extent in the too great specialization in modern medicine. Unless there is the closest coöperation between surgeon and radiologist each one is prone to underrate what the other can accomplish.

In a well localized malignant lump of the breast which has developed recently the rather universally accepted judgment is in favor of surgical treatment. This is agreed to even by the ardent exponents of the irradiation treatment. In addition to the good surgical results in these cases the psychic welfare of the patient is best served by this procedure.

Speaking now of the surgical results, they are best secured even in these apparently simple cases by an extensive removal of the breast with the underlying muscles, and a cleaning out of the axilla. Portmann found about 85 per cent of all the carcinomas of the breast to have axillary invasion. We can, therefore, never be sure that these lymphatics are not involved. This is particularly the case if the disease has developed slowly, and has, therefore, existed for quite a

number of months. Though anticipating somewhat, let me say that I seem to differ from some modern writers by favoring even in these simpler cases routine pre- and postoperative irradiation.

When the disease is farther advanced the outlook becomes of course proportionately less assuring, and the extent of the operation, particularly the extent of removal of the skin, must be increased. All the many apparently pretty methods of incision which are always done with an eye to the closure of the wound, are very liable to sacrifice just a little of the main purpose of the operation for this minor and more negligible gain. The first recurrences occur mostly in the skin of the area of the operation. Too much attention to retain enough skin for closure of the wound is, therefore, meddlesome surgery. This is particularly so because skin transplantation is invariably successful. The removal of the lower three-fourths of the major pectoral and the excision of the minor pectoral are necessary for a satisfactory access to the important axillary and subclavian lymphatic net. It is somewhat dangerous to say (and might perhaps do harm if not emphatically reserved for exceptional cases) that in a very early condition one may *under circumstances* consent to leave more of the muscular structures, remembering that it is the fascial coverings over and under the muscles which harbor the endangered lymphatics. Including some superficial muscle fibers these fasciæ are then removed as extensively as possible together with the contents of the axilla. In some old person, say over seventy-two years, one may feel like compromising somewhat in this

*Read at the annual meeting of the Minnesota State Medical Association, Duluth, July 17, 1934.

way, but it is astonishing how well the operation is tolerated even by these people.

Very young persons, also occasionally older ones, with fulminating growths are probably best not operated upon, but simply rayed. Not long ago I let myself be induced to try operation in such a case, a girl of nineteen years with a polymorphous growth, and I feel that notwithstanding energetic pre- and post-operative irradiation (much more than we use routinely) our procedure did absolutely no good except for a mental effect on the patient by blurring the inevitability of the fatal outcome. The parents in this case were fully informed, but wanted the impossible tried even if only for the meagre psychic benefit. In these cases it is best, if operation is desirable, to simply remove the breast—leaving the axilla alone—after using large doses of radium or x-ray, much larger than in other cases, and to follow with irradiation as soon as possible. Energetic preoperative raying would seem to be of most value in these cases. Patients with cancer en cuirasse are best not operated upon but should be irradiated only.

I refrain from using the very limited time allotted in describing the surgical procedures any further, as they are to be found in any textbook. However, the use of the radio knife merits emphasis.

We must try to have a mental picture of what goes on invisibly at the time of operation. Some time before the Great War, Peterson and Colmers of Czerny's clinic in Heidelberg published their microscopic findings in autopsies after operations for carcinoma of the rectum. These investigations were of greatest interest to me. The authors discovered that in most instances there were monocellular carcinomatous emboli in the lungs in considerable numbers. Now, it is well known that carcinoma of the rectum causes exceedingly rarely and at best only at a very late date clinically recognizable pulmonary metastases. Peterson and Colmers came therefore to the conclusion that in carcinoma many more cells are washed into the general system than there are macroscopic metastases found. It followed *per se* that innumerable single cell emboli must be rendered harmless, particularly as long as the organism is not overwhelmed by the incessant influx. The fact that carcinoma of the breast (like some other kinds) has a great predilection for bone metastases and particularly

for certain of the bones, tells us that seeds, promiscuously sown into the tissues, fall on barren soil in many part of the body. And with this we come to the discussion of the value of irradiation.

I may be wrong in my attitude, but to make this talk of any value at all, rather than summing up what has been written by others, I should like to give you my personal views even at the risk of appearing presumptive. I practiced preoperative irradiation before I read anywhere about it. I calculated that damaged cancer cells, seeded in during the operation, would thus easier be taken care of by the tissues. It really appears even more logical than postoperative irradiation. The autopsy findings mentioned created a different attitude for me from that taken by apparently most radiologists who are anxious to *destroy* as much as possible the cancer cells by preoperative irradiation, and therefore ask for six to eight weeks time to effect it. We made preoperative irradiation a regulation procedure some time before 1910. In 1920 I advocated preoperative irradiation in a discussion at a meeting of the Western Surgical Society, but received no support. This preparatory treatment was continued though Perthes had compared his postoperatively irradiated cases with his untreated ones and saw no benefit from the procedure. Others, especially later on, came, however, to different views.

In comparing results statistically several factors cause difficulty inasmuch as the character of the cases is an item which only very elaborate statements of all details would clear, and at that only in an incomplete measure. We all know that we may have a good run of favorable cases and then again the opposite. However, a single instance may at times bring much light. Let me mention a case which greatly influenced my attitude.

A woman, fifty-three years old, came to our office on April 4, 1902. She had a scirrhus carcinoma of the breast. A Halsted operation was performed, which method I had begun to do by that time. On cleaning out the axilla, which contained several carcinomatous nodes, an uppermost gland, a whitish hard carcinomatous nodule the size of a small French pea, was found situated in the very angle between the clavicle and first rib. A poor prognosis had to be given to husband and son. To mitigate the visible shock and despair I urged right then an energetically persistent x-ray treatment in order to stem the progress of the disease as much as possible. After the wound had healed this patient received at first weekly, then month-

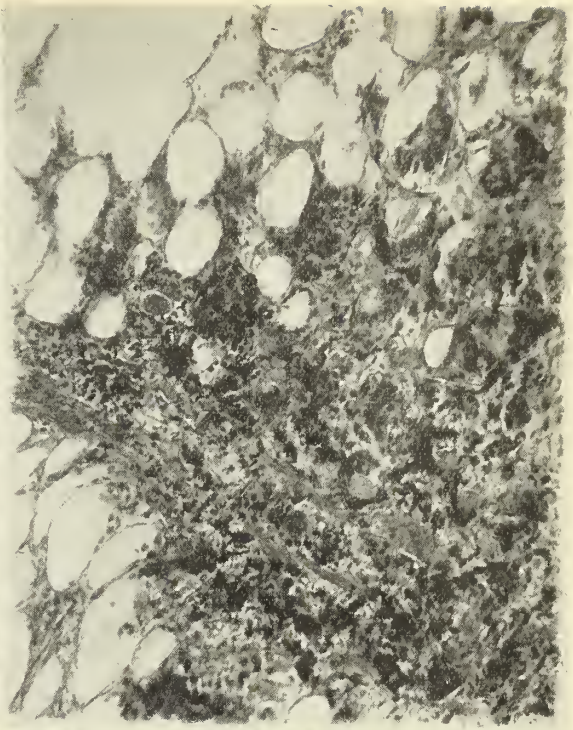


Fig. 1 (*upper left*). Mrs. Wil. Operation February, 1926. This case is shown because of patient's age, *thirty-one years*. Scirrhous carcinoma; no axillary glands. Preoperative and postoperative irradiation. She still gets x-ray twice a year, though there are no signs of recurrence.

Fig. 2 (*upper right*). Same case as Figure 1. Infiltration of the carcinoma into fatty tissue.

Fig. 3 (*lower left*). Mrs. Chr., aged sixty-nine. Adenocarcinoma. Operation December, 1923. Well today at age of eighty-five.

Fig. 4 (*lower right*). Miss Bre., aged forty-three. Scirrhous carcinoma. Operation September, 1922. Well today.

ly, irradiations which amounted to something between a sixth and an eighth of an erythema dose. The dosage in those days was measured with the Sabouraud tablets and was not as exact as you can do today, but when you gave these moderate treatments at monthly intervals, you ran no real risk. The condition of the skin and the disappearance of the axillary hair were reasonably safe guides. Inasmuch as every additional month was considered by the family and by myself as a gift, the irradiation was continued faithfully. For two years our patient received a treatment once a month; during the next two years she had one every second month, though in October, 1903, one and a half years after the operation, the note was made that there was no trace of any recurrence to be made out. Finally the intervals were stretched to three and four months during the fifth and sixth years. No recurrence having shown up at the end of six years the treatments were discontinued. The last treatment was given in January, 1908. So far this case does not tell you very much more than that it may have been simply a lucky instance as we see them often. Even if I tell you that she stayed well for twenty-two years it will perhaps not impress you much. But now comes the feature which makes me speak of this case as one which proves the effect of irradiation in a picturesque way. For twenty-two years this woman had no signs of any recurrence and then there started *numerous* little skin nodes *simultaneously* in the area of the operative field. They increased in size and metastases showed up in different part of the body. She died from generalized carcinomatosis within a year, twenty-three years after her operation, at the age of seventy-six.

Carcinoma starts most always unicentrically and spreads from this focus. Very rarely you see a bifocal start. In our case there were several dozens of carcinoma nodes developing at the same time. They must, therefore, have been secondary seedlings planted at the time of operation or before. They were held in check by the long continued roentgenization, continued for six years. At the joint session of the German surgical and the German roentgenologic societies in 1931, the outstanding result of the meeting was that the severe massive doses which have been generally employed were declared not to yield results comparable with milder treatment continued over a long period.

You might ask if further prolonged irradiation in the mentioned case could not have still further delayed recurrence or even caused a definite cure. I recently saw a patient whom we now have given irradiation in the mentioned manner for ten years, and another for nearly nine. The last few years these two patients received not more than two treatments per year. We intend to continue with treatments every six months up

to twelve years after operation. We have never seen fibrosis of the lungs, or any unfavorable consequences, from these prolonged, but, in the eyes of many roentgenologists, unduly small, doses.

Five years ago a woman was operated upon for an advanced carcinoma of the right breast. Seven months later she came to our office. On *that* side of the chest a great number of nodes had appeared under the skin, some the size of lima beans. Her surgeon, a very capable man, had given her up. She was then given irradiation as we do in our cases. The nodes stopped their rapid growth and gradually receded. They practically disappeared in the first affected area near the operative field. New nodes appeared below the breast region and as far back as the posterior axillary line. We continued with the mild doses, changing the areas as the new situation required. Her condition was reasonably good for four years, when the left breast became involved. During our vacation she then received over her right side an apparently strong (at least a stronger) treatment by a most expert radiologist. She became quite sick and weak. When she came back to us two months later her whole right side had become crusty. Last fall we removed the left breast and started again with weak treatments. But the right side of the chest secreted much, large crusts formed and when we had to hold off this spring from further raying, other nodes in the periphery grew. This is a case of a patient living five years after having been given up by her surgeon, who has an up-to-date radiologic equipment. I am inclined to think that if she had not had a strong intervening x-ray dose it would have been better.

As to preoperative irradiation, we give for three days, mostly directly preceding the operation, a daily treatment, in all about half an erythema dose of medium hard rays, unless large glands indicate more. We have not changed the procedure since the beginning. We estimate that the carcinoma cells which may be liberated at the time of operation have been—you might say—stunned. Such moderate raying does not interfere in the least with the wound healing. But if Peterson and Colmers' observations are correct, even a moderate damage to the cancer cells would render them easier disposed of by the tissues. The so-called stimulating effect of small doses, of which much was written in earlier days, always looked to me more like the wriggling of the worm that is hurt. After all, only experience can give the answer.

Take a patient who, before you were called, had some very irrational treatment; for instance, rubbing and squeezing by massage. In such a case cancer cells will be forced into the lymphatics and spread as far as this mischievous proce-

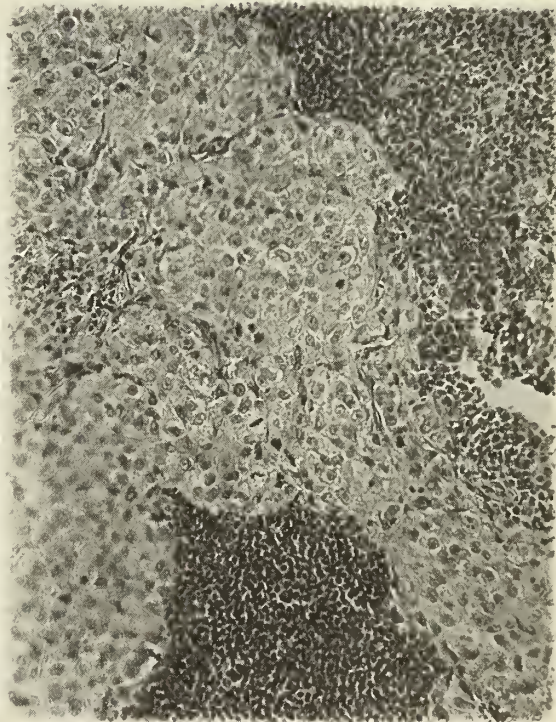
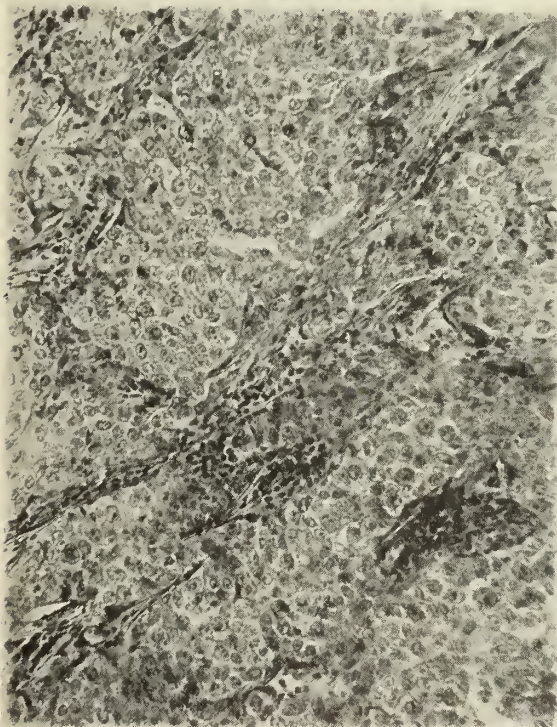
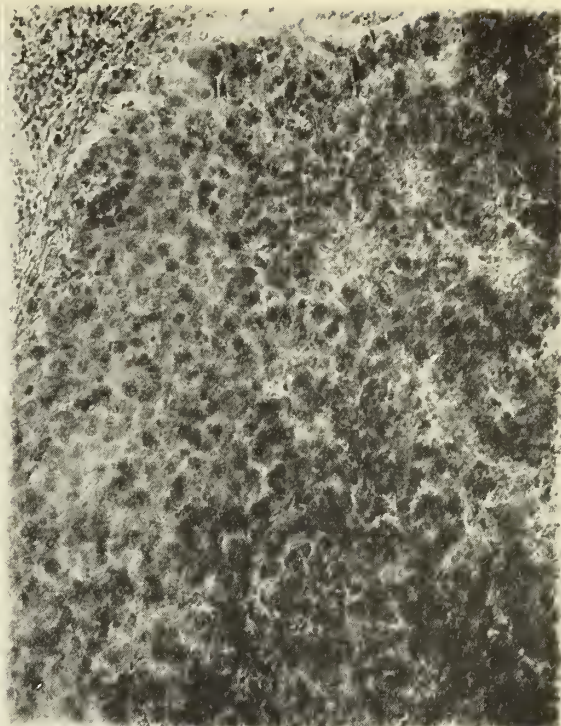


Fig. 5 (*upper left*). Mrs. Zil., aged fifty-seven. Duct carcinoma. Operation April, 1922. Well today.

Fig. 6 (*upper right*). Mrs. Gun., aged fifty-four. Borderline adenocarcinoma. Operation November, 1918. Well today. Had no x-ray.

Fig. 7 (*lower left*). Mrs. Cla. Medullary carcinoma. Operation October, 1913. Died of diabetes in March, 1934. No recurrence.

Fig. 8 (*lower right*). Same case as Figure 7. Metastasis in lymph node.

ture can get them to travel. Operation, alone and unassisted, then encounters a treacherous proposition. Here we sorely need the help of the rays. In February, 1910, a woman of thirty-one years came to us with a carcinoma of the breast, which on later microscopic examination



Fig. 9. Mrs. Map. Scirrhus. Operation September, 1912. Well today.

proved to be a scirrhus. In some areas there was an exuberant growth of the carcinoma solidum type. The patient had been massaged by an osteopath for a month and a half. The initial thickening had been noticed by the patient nine months previously, but grew slowly. A three day preoperative and persistently prolonged post-operative treatment by irradiation must have been an important factor in explaining that this woman is well today, after twenty-four years (Fig. 10).

Time does not allow me to go more into details of our subject beyond a few aphoristic statements.

1. Surgery, even in well localized mammary carcinoma, should be radical, obeying Halsted's teaching. Only exceptionally and for serious reasons may we be allowed to deviate somewhat from this principle.

2. The radio knife is of great advantage in sealing the wound, rendering it less ready for implantation.

3. The great danger of implanting liberated carcinoma cells during the operation is to be kept in mind constantly. The breast itself, after it is partly freed and its lymphatics are widely opened, is therefore to be considered as a possible source of inoculation into the wound. Gauze protection and gentleness in manipulation are thus important. Undoubtedly the brutal burning methods have a real advantage in this respect.

4. In far advanced conditions the excision of foul smelling ulcers by cautery or otherwise, followed or not by Thiersch transplantation, may become desirable.

5. When unbearable pain persists in recurrence after operation and the arm is greatly swollen and useless I have seen in one case great relief from an interscapular exarticulation of the arm, as advised by Carl Beck. The patient was very grateful.

6. Preoperative irradiation confined to three days appeared to us of great benefit. (It is quite possible that our usual dose should be increased to get the best results.) As this involves no loss of valuable time, it should be more readily consented to by many surgeons who would object to a delay of eight weeks, as some modern radiologists demand for preoperative treatment. Besides, such loss of time and the mental strain on the patient with the operation constantly before the eyes, is not to be underrated. It would probably be too bold to state that our results are as good as after more energetic preoperative irradiation, but for myself I am convinced of the value and desirability of moderate doses. When we use radium, fifty or more mgrs. over a wooden block 3 cm. thick are applied to different fields, to the amount of from 1,200 to 2,000 milligram hours as the case may require. This, with a day or two of rest before the operation, does not disturb the patient.

7. Postoperative irradiation, moderate in dosage but continued over a long period, in many cases if possible even over a *very long* period, seems to be of greatest value.

8. The dose of a single postoperative treatment, as we are giving it of late and as we estimate we have always given approximately, ranges between 60 and 80 roentgens after two to four stronger initial doses of about 130 "r." Eighty

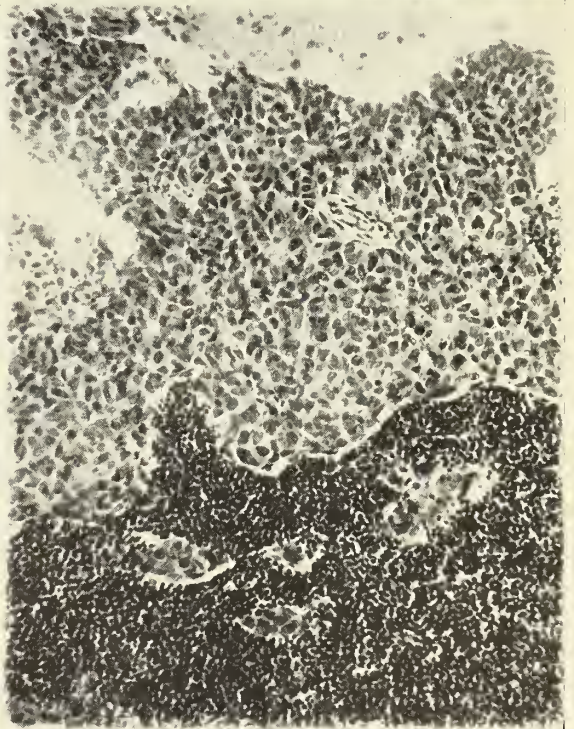
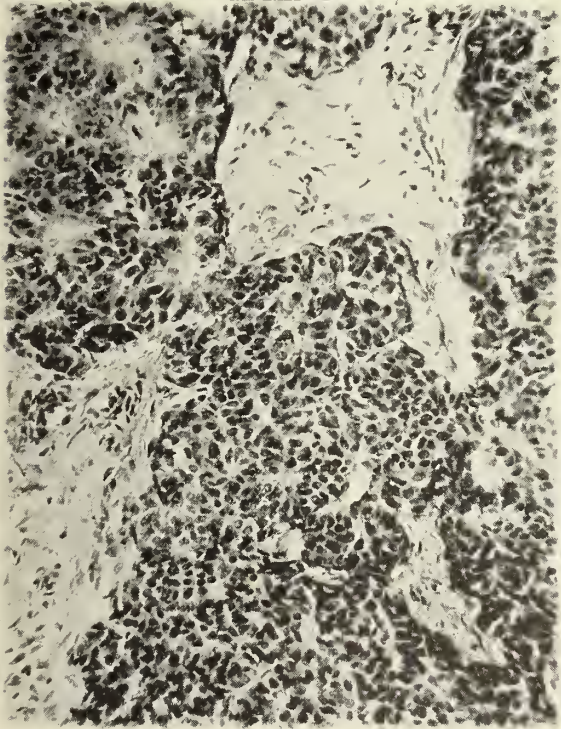
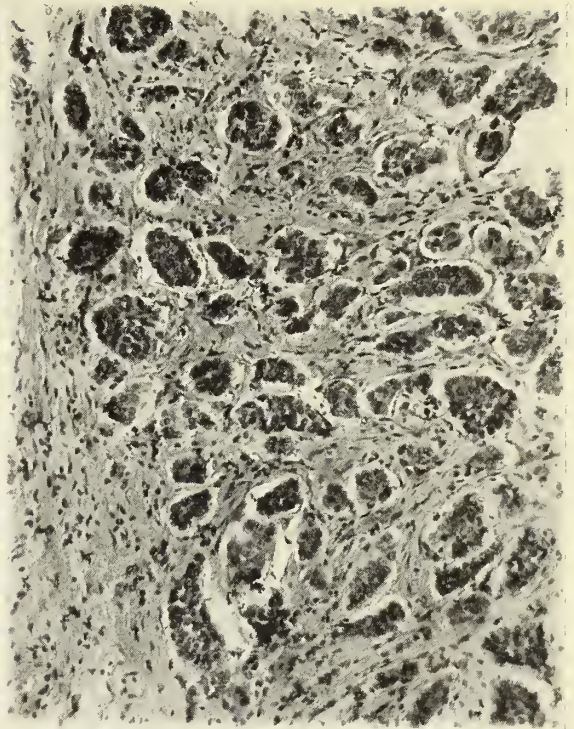
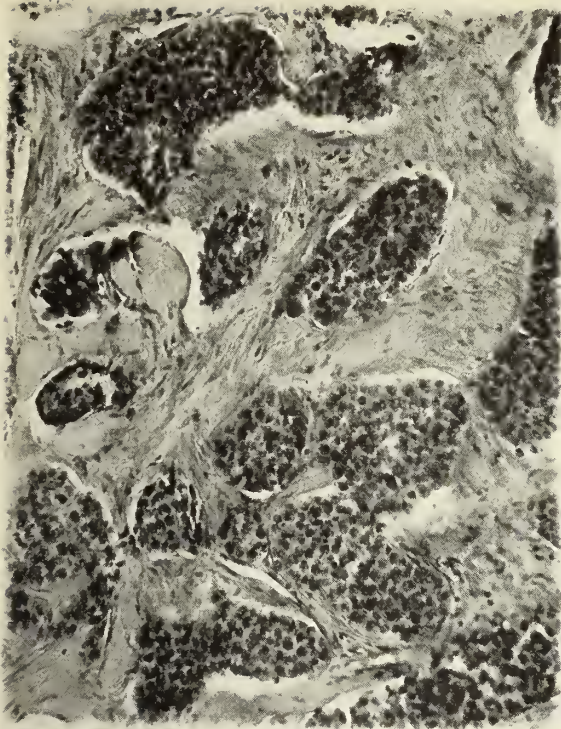


Fig. 10 (*upper left*). Mrs. Pec. Carcinoma solidum on soil of cystic disease. Exuberant growth in areas. Operation February, 1910. Well today. Patient was only thirty-one years old at time of operation.

Fig. 12 (*lower left*). Mrs. Ack., aged thirty. Carcinoma simplex with metastases. Operation April, 1908. Well after twenty-six years and three months.

Fig. 11 (*upper right*). Mrs. War., aged sixty-four. Scirrhous carcinoma. Operation October, 1908. Died of old age (eighty-nine years) in July, 1932. No signs of recurrence.

Fig. 13 (*lower right*). Same case as Figure 12. Metastasis in lymph node.

"r" are about one-tenth of an erythema dose. The first three doses are usually given at one-week intervals, then the next two or three doses at intervals of two weeks. After this the patient receives one treatment a month for two years, then for the next two years, if there is no particular reason to give more, one every second month, and if the patient lives, and we can make them see the value of perseverance, they get three or four treatments during the fifth and sixth years. After this, in cases where we had made originally a poor prognosis, we like to give a treatment twice a year for several years more. This is, of course, not given as a formula for others, but simply as a statement of our procedure which seemed best to us from our own observations.

9. Castration, as advised by some earlier authors, has apparently no marked effect on the course of the disease.

10. Though we operate on practically every case which is not too unreasonably far advanced I feel that irradiation will gradually come more into its rights and is at present a most important help to surgery, as well pre- as postoperatively. I should not feel that I was doing my duty toward the patient if I did not insistently explain to her the importance of irradiation and make sure of her seeing the situation in the proper light.

Personal Records

Our experience with diseases of the breast comprises a little over 400 operations. In 231 of these the diagnosis of malignancy was made. In 1902 our histories began to record systematic and prolonged postoperative irradiation. For the period therefore from 1902 to ten years ago (May, 1924) I examined my material to get as much as possible at a picture of my real end results. Even the ten year test, though rather rigorous, yields of course not an absolutely definite final picture.

While there were no operative deaths, a number of cases had to be disregarded on account of insufficient data, especially the microscopic findings. Four such cases, living and well today, had thus to be eliminated—of course to our regret.

The microscopic slides which we had were examined recently by Dr. Arthur Pederson, head of the pathological department of St. Joseph's hospital, as well as by me. Only those cases

were considered where our diagnoses concurred, and in addition were confirmed by Professor E. T. Bell of the University of Minnesota. Thus, in three other cases, also living and well today, there was a difference of opinion as to the malignancy. They too had to be left out.

On the other hand, whether our notes were complete or not, almost all the bad results could be traced by an investigation of the death certificates. The Bureau of Vital Statistics of the State of Minnesota helped us very efficiently in tracing the dates of death of many of the patients and I feel it an obligation to mention this valuable and most courteous assistance.

There remained for the period from 1902 up to ten years ago sixty-four patients for our consideration. Some of these had more than one operation. Sixteen of them are living and well today, six died without recurrence, and forty-two with recurrence.

The details of the sixteen who are living and well today are briefly presented in the accompanying table (Table I).

Besides these sixteen living patients there were six who died without a recurrence. Details are presented in Table II.

Of the remaining forty-two patients who died sooner or later of their carcinoma eleven died during the first year, six during the second year, three during the third year, two during the fourth year, eight during the fifth year, four during the sixth year, one during the eighth year, three during the ninth, twelfth and fourteenth years, and one after twenty-three years.

Those who died within a year after the operation were, of course, mostly too far advanced and the operation was often done only for temporary comfort with no expectation of a cure, such as with extensive ulceration, etc. At other times an unexpected metastasis in the liver or spine soon caused symptoms. Some cases always remain that neither knife nor ray will cure.

Disregarding the patients who died free from recurrence less than ten years after operation there remained sixty-one cases to be grouped. Sixteen of these patients are living and well today. Three died free from recurrence more than ten years after operation, which raises the percentage of ten year cures to 31 per cent. Adding three more patients who died more than ten years after operation (but with recurrence) we have

TABLE I

Date	Name	Age	Period Yrs.	Free Mo.	Annotations
Apr. 1908	Ack.	30	26	3	Had 30 x-ray treatments. Carcinoma solidum (Fig. 12). Lymph node metastases.
Feb. 1910	Pec.	31	24	5	Persistent x-ray treatment. Scirrhus carcinoma, partly with exuberant growth (Fig. 10).
Dec. 1911	Kre.	37	22	7	Adenocarcinoma.
Sept. 1912	Map.		21	10	Scirrhus.
May 1918	Car.	48	16	2	Preoperative and postoperative x-ray.
Nov. 1918	Gun.	54	15	8	Had no x-ray treatment. Papillomatous cyst, malignant. Borderline adenocarcinoma.
Jan. 1919	Wil.	45	15	6	Had no x-ray treatment.
Apr. 1919	Sym.	65	15	3	Cauliflower cyst, adherent to skin. Carcinoma. Pre-operative x-ray and 4,500 mg. hrs. Radium right after operation.
Nov. 1919	Dub.	44	14	8	In Nov., 1933, operation for carcinoma of other breast.
Oct. 1920	Gre.		13	9	Preoperative and postoperative x-ray.
Oct. 1920	Hil.		13	9	
Apr. 1922	Zil.	57	12	3	Enlarged axillary glands. Preoperative x-ray. Post-operative x-ray irregularly, last treatment Oct., 1927.
Nov. 1922	Bre.	43	11	8	Carcinoma solidum, partly scirrhus. Had preoperative x-ray, and is still getting x-ray treatments.
Dec. 1923	Chr.	69	10	7	Adenocarcinoma. Mass size of plum, partly cystic. Apparently no postoperative x-ray.
Jan. 1924	Woo.	37	10	6	Had childbirth in Dec., 1924. Radium in 1925. Partly adenocarcinoma, partly scirrhus. Axilla free.
Feb. 1924	Mun.	64	10	5	Thiersch grafts needed. Still gets x-ray treatment twice a year. In 1926 thyroidectomy for large colloid goiter.

TABLE II

Date	Age	Name	Date of death	Cause of death	Survived Yrs. Mo.	Annotations
Oct. 1908	64	War.	July 1932	Old age (88 yrs.)	23 9	Had postoperative persistent x-ray treatment. At time of operation tumor firmly attached to skin. Supra-clavic glands removed, 1910, negative for carcinoma.
Oct. 1913		Cla.	Mar. 1934	Diabetes	20 5	Preoperative and postoperative x-ray. At time of operation growth attached to pectoral muscle.
Jan. 1918	67	Dit.	Apr. 1933	Arteriosclerosis (82 yrs.)	15 3	Preoperative and postoperative x-ray treatment.
Feb. 1918	54	Mar.	Jan. 1925	Pernicious anemia	6 11	Preoperative and postoperative x-ray treatment.
June 1921	87	Rem.	May 1924	Old age (90 yrs.) Felt well for over 2 years after operation	2 11	Patient, mother of a physician, wanted operation, which was done with local anesthesia.
Mar. 1919	46	Sch.	Mar. 1920	Acute nephritis	1	

twenty-two who lived longer than ten years (36 per cent). Sixty-four per cent lived more than four years after operation.

My material is too small to prove anything definitely, but the percentage of long lasting cures speaks for the value of persistent irradiation in combination with surgery.

tion in combination with surgery.

I feel it a pleasant duty to express here the sincere thanks to my former associate, Dr. F. C. Schuldt, not only for the excellent preservation which these old sections show, but particularly that they could still be found.

OVARIAN TUMORS ARISING FROM EMBRYONIC RESTS*

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TUMORS arising from embryonic cells may consist of practically any type of body tissues. The ovary is a particularly fertile field for various bizarre types of tumors, and it is the more unusual ones which have been grouped together for discussion here. Some of these tumors exert a definite hormonal influence upon the patients carrying them; it is the result of the action of their various hormones which makes these tumors especially interesting from the physiologic and clinical standpoints.

Embryology

A short review of the development of the urogenital tubules and sex glands will present the facts upon which the various theories of origin of ovarian neoplasms are based.

In the early embryo, three successive sets of urogenital tubules develop: (1) the pronephros, which does not persist, but whose ducts partially form the ducts of the second set; (2) the mesonephros (2-3 mm. embryo) which forms the Wolffian body with its ducts and a primitive kidney; (3) the metanephros, which is formed partly from the mesonephros, and forms the permanent kidney.

The second set of tubules just mentioned, the mesonephros, is the one most intimately concerned with the genital apparatus. It forms, in its caudal or genital portion, the Wolffian ducts, which persist and function in the male as the seminal vesicles, efferent ductules, etc., but in the female only the rudimentary epoöphoron and the rete ovarii remain in the adult.

The genital ridge is a mass of mesenchymal cells which forms medial to the above sets of tubules and eventually gives rise to the sex gland, both in the male and female. The mass of cells in the genital ridge migrates down to the pelvis and comes into close contact with the Wolffian body. The Wolffian body furnishes the connective tissue for the ovary while the genital ridge cells form a surface layer over it. Wini-

warter has shown that three successive proliferations of the germinal epithelium occur. First, the medullary cords are formed by a proliferation of the germinal epithelium, which penetrates down into the mass of cells. These cords degenerate in the female but form the seminiferous tubules in the male. Second, there are the Pflueger's cords and tubules, which form primordial follicles without ovules and then degenerate after birth. Masses of cells which are to become Graafian follicles with ova constitute the third. Recent investigators deny that these tubules ever actually communicate with the Wolffian ducts in the human (in some mammals they do communicate). The theory of origin of ovarian cysts from Wolffian duct rests is based upon the latter assumption.

Other cells of germinal ridge origin form the interstitial cells of the ovary, as was shown by Lane-Clayton. Connective tissue cells derived from the Wolffian body surround these cell masses and cut them off from one another and from the surface epithelium. Opinion seems to be unanimous that ova, in the human, are all formed in fetal and perhaps the first two years of post-natal life. In some mammals oögenesis occurs throughout life. Thus, all epithelial elements of the ovary are derived from the germinal epithelium and there occurs great proliferative and degenerative activity throughout fetal life.

Dermoids or Teratomas

The term "dermoid" is being gradually discarded in favor of better terms such as "teratoma" and "embryoma." All these terms refer to tumors usually containing cells derived from all three germ layers, but occasionally having only one germ layer represented. There has been much speculation centered about the origin of these interesting tumors. The three most important theories of origin of ovarian teratomas are as follows:

1. The earliest theory was that they were

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"mixed tumors" arising from fetal rests of already differentiated cells in the ovary.

2. The theory which held sway for many years and is still retained by some, is the blastomere theory of Marchand-Bonnet. They believe that a blastomere became displaced in early fetal life and later developed, having potentialities for all three germ layer cells. This theory best explains dermoids in other parts of the body, since the blastomere might be displaced to any part of the developing fetus.

3. More recently, the parthenogenetic theory, which was first formulated by Wilms, has been modified and is being given wide support. This theory holds that a primitive sex cell, perhaps a cell from a medullary cord or Pflueger's cord, is retained and begins to divide without being fertilized. The tumor could potentially contain all types of tissue. In this connection, Loeb has shown that parthenogenesis occurs in guinea pig ovaries. Other experimenters have produced parthenogenetic development of ova in lower forms, such as the sea urchin. A point which this theory does not explain is the fact that sex cells—ova and spermatozoa—or their predecessors, are never found in teratomas. Heart and liver tissue, also, have never been found in teratomas.

Whatever their derivation, the dermoids or teratomas are very interesting. The usual forms, containing hair, teeth, glands, nerve tissue, etc., are fairly common (4 to 5 per cent of all ovarian tumors) and I will not discuss them further. Several unusual types of teratomas, however, are interesting. These are tumors containing primarily one type of tissue, which presumably develops at the expense of all others.

Important among these are the so-called ovarian struma, tumors consisting wholly, or practically so, of thyroid tissue. I have reported a series of six such cases. Two of these occurred in women who had definite hyperthyroidism. The others had questionable hyperthyroidism as evidenced by rapid pulse rate, nervousness, etc., but the basal metabolic rates were not taken. The iodine content of three of these tumors was determined and found to be more than that which normally occurs in ovarian tissue, as high as .105 per cent. Recently, Plaut of New York, has investigated a group of these tumors biologically by feeding the tumor tissue to tadpoles. In one or two instances he observed in-

creased rate of growth. Most of the tumors which I examined showed evidences of hyperplasia of the thyroid epithelium. One of these tumors also contained a mass of polygonal cells which were very suggestive of parathyroid tissue. Another interesting teratoma is one reported by Saxer. He found an ovary containing a tooth without other teratomatous structures.

Pseudomucinous Cystadenomas

Ribbert first advanced the theory that pseudomucinous cystadenomas are of teratomatous origin, with cells of intestinal anlage being the only ones to develop. This brings a very large group of tumors into the class of teratomas. In favor of his view is the fact that pseudomucinous cystadenomas have an epithelium strikingly similar to that of the intestine. Second, they occur frequently in association with the usual type of dermoid or teratoma. Third, the origin of pseudomucinous cystadenomas is not from the invaginations of the germinal epithelium, as has been shown for serous cystadenomas.

Granulosa—Cell Tumors

These are the ovarian tumors most frequently mentioned in recent literature. Older writers, such as Pfannenstiehl, claimed that no tumor ever arose from follicle cells. More recently R. Meyer has expressed the opinion that they arise from preformed follicle epithelium. Gottschalk believes they arise from primordial follicle cells. Ujina is the only one I have found who believes they come from ripe follicle cells. It is unlikely that these tumors form from adult follicle cells because the life of follicular tissue is so entirely dependent upon the life of the ovum which it surrounds.

Meyer and others are now quite firmly convinced that they arise from embryonic rests of ovarian parenchyma, which are closely related to granulosa cells. The embryonic rests are very likely to be cells of the embryonic Pflueger's cords which have not degenerated as they ordinarily do and are stimulated to grow by some as yet unknown stimulus. Evidence in favor of this theory is derived from the following facts: (1) that proliferative changes in the follicles are never observed, even though we examine many ovaries with inflammatory changes and other proliferative changes; (2) that very small, early granulosa tumors, when found, have always been

located in the hilus of the ovary away from the cortex (Telinde); (3) that granulosa cell tumors occur much more frequently in women after the menopause, when follicles are atrophied, than during the active life of follicle cells. Occasionally they occur in children.

Clinically, these tumors cause what has been designated feminization, in contradistinction to other tumors which cause masculinization. They usually cause uterine hyperplasia with menorrhagia. Occasionally the endometrium has hypertrophied to the stage of a decidua. The breasts frequently hypertrophy, also. When these tumors occur in children they cause precocious puberty and sexual development. Removal of the tumor gives a complete loss of these unusual findings. They are not highly malignant.

Hormone production by these tumors has been investigated by various Germans (Plate, Dworzak, etc.). Follicular hormone is produced in large amounts. Schuschania presents the case of a 67 year old woman. Preoperatively, 326 mouse units of ovarian hormone were present in the urine. Eight days postoperatively 158 units were found, and sixty days postoperatively the hormone was entirely absent. Further studies along these lines should be carried on.

Microscopically, these tumors show various structures but there are usually follicle-like formations and cysts. The follicle-like cells may surround cysts, or occur in solid masses, or in cords. The masses of cells are always surrounded by dense connective tissue which forms a prominent part of the tumor. It has even been stated by some authors that ovarian sarcomas are really granulosa cell tumors because of the prominence of the connective tissue elements in these tumors.

Brenner has described "oöphoroma folliculare," which belongs to this group but is somewhat atypical.

Arrhenoblastoma

Recently, cases of ovarian tumor having a hormone effect which causes masculinization have been reported. At present twenty-six reports have appeared in the literature. No other ovarian tumor causes masculinization, so far as is known, except adrenal tumor.

Pick in 1905 first described such a tumor, which he called adenoma tubulare testiculare ovarii, and believed it arose from the testicular

portion of an ovotestis. R. Meyer, who has seen the largest number of these tumors, believe they arise from original sexually bivalent cells of the early embryo; that is, they may be classed as teratomas since they arise from embryonic rests of the germinal ridge, which now develop toward the masculine side. This brings up the question of the interrelationship of sex characteristics of cells. In certain animals a type of hermaphrodite individual is known, called a "free-martin." This animal has the female type of external genitalia and male internal genital organs. The gonad, or sex cell, is primarily female, but a transition occurs from medullary cords into seminiferous tubules. This bisexuality has actually been observed. In experimental work, Brambell and Parks have shown that in irradiated ovaries of fetal and very young mice, the germinal epithelium proliferates and invaginates the ovary, forming quite typical medullary cords as well as spermatid tubules. Thus two types of sex reversal have been actually observed. Investigators of sex reversal have concluded that (1) the ovaries possess a certain instability which is never observed in the testes, and (2) the right ovary exhibits testicular transformation more often than the left.

Three types of the arrhenoblastoma have been observed by Meyer: (1) the typical well developed tubular tumors similar to that first described by Pick; (2) atypical forms with small atypical tubules and masses of cells; (3) an intermediate form between these two. It is interesting that the second atypical type of structure causes the most marked clinical symptoms of masculinization.

Clinically, these tumors occur most frequently in young adults (adrenal tumors causing masculinization being most apt to occur in children), but may occur at any age. They cause more or less marked degrees of masculinization. One of the early signs is deepening of the voice, then hirsutism, male type of body structure and gait, atrophy of the breasts and always amenorrhea.

After removal of the tumor, menses usually begin again, and cases of pregnancy carried to term have been reported. The voice regresses, hair growth gradually ceases, and the individual again attains a feminine habitus.

These tumors are not highly malignant. Therefore the opposite ovary should not be removed if the diagnosis can be made at operation, as the

function of the normal ovary brings back normal feminine traits. R. Meyer speculates as to whether a mixed tumor, containing both tubular (testicular) tissue and granulosa cell types could cause both masculinization and hypertrophy of endometrium, breasts, etc.

Disgerminoma or Seminoma

This type of tumor is mentioned because its structure resembles testicular structure. These tumors may be related to the arrhenoblastoma, but do not have the marked hormonal influence. They occur in both ovaries and testes and are more malignant. In the ovary they occur in children and young adults, but when affecting the testicle are found later in life. In women, the disgerminoma often causes atrophy of the external genitalia and uterus, while in men it may occur in cryptorchidism. These tumors are also thought to arise from cells which existed

in the embryo before the stage of sex differentiation.

Parovarian Cysts

These should be mentioned in this discussion because they obviously arise from embryonic rests, the paroöphoronic tubules which are remains of the Wolffian ducts. Parovarian "dermoids" also occur but are very rare. However, some authors believe that all dermoids arise from the parovarium and secondarily involve the ovary. Parovarian cysts occur most frequently in young adult women. They have never been known to have any hormone content. Symptoms are absent unless the tumors attain sufficient size to cause pressure.

Microscopically, parovarian cysts are thin walled structures with a flat layer of cells lining the cavity. They are formed from dilatations of parovarian tubules, and are usually unilocular, with clear fluid contents.

FEDERAL EMERGENCY RELIEF*

J. G. CROWNHART, Secretary

**State Medical Society of Wisconsin, Wisconsin Hospital Association
Madison, Wisconsin**

IN any consideration of our vast relief problem as it now presents itself, it is essential that we clearly define the viewpoints on which our discussion is based. I would view this problem with you on three separate fronts. The first of these is the front of the tax-paying citizen who looks at the relief problem with all the concern of one who seeks to know what the government is doing and why. Our second view is at the firing line of medical relief from the viewpoint of the physician in the field concerned with rendering an adequate medical service to his people. And then very briefly we shall step into the divisional office to look at the map on which are charted our health advances and defeats that we may know what methods of attack give promise of greatest success in the future.

Turning then to our first front, the viewpoint

of the citizen tax-payer, what is the significance of all of these millions of dollars for relief?

The relief system of practically every state in the United States is based on the pauper laws of Queen Elizabeth's time and before. Relief is still variously described in the laws of your state and mine as being for the "blind, old, lame, decrepit, indigent, and the pauper." We have spoken of it in terms of alms, gifts, and charity. As citizens we must be frank to admit that everywhere we have had a collection of worse than poor, poor relief laws.

The period of economic pressure brought to us an entirely new group in dire need of help, a group that today comprises in excess of 95 per cent of all those who are receiving relief funds. The wage earners among these people have an ability to work that is their capital and that capital is unimpaired. They are ready to invest it and to earn their living and a living for those

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dependent upon them. They are not paupers although they are without the means to purchase the necessities of life because they find themselves without the ability to locate employment.

This tremendous influx of those who must be supported until they find work brought about the final breakdown in our archaic poor relief laws. We declared that these people should not starve, yet the communities found themselves unable to cope with this problem in social arithmetic and state after state turned to the federal government for help. In the early days of federal aid it was on the basis of loans. But when the extent of the problem became more clearly defined, we had the establishment of the Federal Emergency Relief Administration with its monthly allotments of millions of dollars to state after state in accordance with the financial and relief needs in those states.

The picture of relief changes in such a kaleidoscopic fashion that it is almost impossible even to talk in generalities. We speak of an emergency and the very designation of the relief administration is prefaced by that word emergency. A year ago, however, federal administrators commenced to lay their plans for a five or ten year program. Today they are ready to suggest that, so far as it is possible for them to see in the future, the federal relief administration, in one form or another, now has all the earmarks of permanency.

We are so accustomed to speak in terms of millions of dollars that it would be easy for us as citizens to forget the real unit of measurement. In relief the unit is the family in need and we find that when we get down to that unit, because there are so many of them, our sums that are so large in their totals represent but comparatively few dollars per month per family to cover the necessities of life—shelter, heat, food, clothing and medical care. Thus on the basis of a recent compilation it was shown that in Minnesota the amount available per family of four per month to cover all of these needs in the month of January, 1934, amounted to but \$20.78, while in the United States as a whole during the same month the average relief cost per family was \$16.77. These are small sums, indeed.

As a citizen, we thus see a front where the appropriations are vast but where the needs are so great that the amount available per month per

family on relief is hardly sufficient to cover basic necessities of life.

Medical Service

Now let us shift our view to that sector of the front wherein physicians are individually administering to the health needs of their people. Long before we had a report of any foundation subsidized Committee on the Costs of Medical Care, organized medicine had repeatedly declared that if the people were directly concerned about the distribution of the costs of care then they must recognize that the first means of spreading the costs was to relieve the individual practicing physician of the burden of caring for the wholly indigent. We pointed out that just as the wholly indigent represented a community responsibility for his food, clothing, and shelter, so must he represent a community responsibility for that prime necessity of life, needed medical attention. If this were accomplished, then that charitable work that will always characterize the profession of medicine increasingly might be given to those who, under no few handicaps, are endeavoring to maintain an independent financial status in life.

It should be noted, however, that nowhere did medicine say that care of the poor was a federal responsibility. With the collapse of our community poor relief systems, federal funds of necessity had to enter into the relief picture and in such amounts that there came about that natural corollary of money distribution—control of distribution by the source of the fund. So did we see control by the federal government of the distribution of these vast sums allotted for relief purposes to the several states. We found the establishment of a social machine for the delivery of relief funds wherein the rules and administration were in the hands of people who, while the best available, frequently were little qualified by experience or training to know health needs or degree of adequacy with which those needs must be met.

The relief problem had become so large and involved such a high proportion of our population, however, that the physician, overwhelmed with a charitable burden which he could no longer carry and survive, welcomed the entry of federal funds into his picture, despite a keen apprehension over the future of government in medicine. The physician found that if he would

agree to a schedule of allowances that represented on the whole not much more than the cost of delivering the service, and if he would agree to abide by the rules of the relief administration, he could have some remuneration, however small, to assist him in caring, in office and home, for the medical needs of the tremendous numbers that had been forced on the relief rolls.

Despite the fact that the physician felt very keenly that the system of distribution was one based on a program of remote control not conducive to a proper health program, the physician too stood in dire financial need and frequently required this partial lifting of a burden that had grown far too heavy for him to carry alone.

Speaking in dangerous generalities I would say that when we view the sector of the physician in the field of relief we are impressed that the system works poorly when any of these features are to be found in the medical administration:

1. When there is a national plan that attempts to lay down for Minnesota and Mississippi, Wisconsin and Wyoming, the exact procedures under which medical service is to be rendered or denied.
2. When the physician is encouraged to look upon joint federal and state relief funds as a source of pay for service rendered, for at the very best we can only say that we have been given schedules of allowances for just some of the service that we must give to the people.
3. When the social administrator has attempted to diagnose the medical needs of the patient.
4. When there is a lack of coöperation and understanding between organized medicine and the relief administrators.

The system works reasonably well as a partial relief system when all of the following features are present:

1. When the state relief department is given reasonable leeway in preparing a state program that will meet conditions peculiar to the state.
2. When the physician looks upon relief as an effort of the government to assist him as best it may in continuing his charitable service to cover a suddenly and tremendously enlarged load.
3. When there is a clear division of responsibility between the social administrator and

the physician to the end that the physician dictates the medical needs of his patient and the administrator concerns himself as a social economist.

4. Where there is the closest working coöperation between the County Medical Society and the County Relief Administrators, and the State Medical Society and the State Relief Department. I cannot over-emphasize the importance of such coöperation. It needs to be obtained at all costs for upon that coöperation rests the future understanding and future modifications which will insure to those on relief rolls the best available service under the limitations that the government of budgetary necessity must impose.

The Third Sector

Finally, let us view federal emergency relief in its medical aspects to the end of answering for ourselves whether this is a system, the extension of which to so-called low income groups will promote either the delivery of medical service or the delivery of a more adequate medical service. We need not now turn to Europe to say what would happen in this country under such a system of compulsory health insurance. We have our own experience under the emergency plan which presumably was intended to insure the necessities of life for substantially one-sixth of the people in this nation. It has been in effect over a year and we should be in position to say now whether its effectiveness is limited to aiding physicians to care for the poor in a financial emergency, or whether this system gives promise of higher service to all people through its extension.

The physician who observes medical service under federal emergency relief is impressed with these points:

1. It does recognize the family physician-patient relationship that is so essential to adequate medical service. In large areas, however, this relationship does not exist in fact.
2. It places, however, a positive government approval upon what might well be exceedingly bad medicine when it offers to give the physician an allowance for an operation in the home, and pay for a nurse if that be necessary, but refuses to pay any concerned

if the operation be performed in the confines of a hospital. I say this is a positive government premium on what might well be exceedingly bad medicine. That it has not occurred in fact, as it has not, is to the very great credit of the profession itself and none to the government.

3. Medical service under this plan is chiefly concerned in keeping the patient alive and little concerned with keeping him well. Prevention of disease has played little or no part in the program. The emphasis is placed upon minimums of care rather than essentials of health.
4. Directors have been laymen largely unacquainted with any part of the real problem that physicians face daily, and yet all too frequently have considered themselves diagnosticians of the medical needs as well as the social needs of their charges to the very great detriment of any reasonably satisfactory medical service.
5. Directors everywhere have been responsible first to the government fiscal agencies and their rules. The budget has dictated the service for which allowances would be paid and not the needs of the patient as stated by the physician.
6. Physicians have not been paid for their services but have been given allowances in an effort to supplement their efforts in a time of crisis.

In a few minutes together we have looked at relief from the viewpoint of a citizen, from the viewpoint of the physician and now we have gone into the divisional office to see whether an extension of this program promises most for the health needs of other large groups of our population. This question we must answer in the negative.

In this entire situation we have had no demonstration of any breakdown in the institution of medicine as it has been built throughout these many, many years. Hospitals have had no bank holidays. Physicians have declared no strikes. It has been well said by Mr. Harry L. Hopkins, Federal Relief Administrator, that throughout the years 1930-1931-1932-1933 "medical care was given free in the first place by the doctors. The doctors held the bag, there is no question about it, from one end of the country to the other. The medical profession gave free med-

ical care to the unemployed * * * and when the record of this depression is written it will show that if there ever was one man that gave things without any return in this unemployment crisis, it was the doctor, from one end of the country to the other. It is a grand story, the work the physicians did for the unemployed."

Now I assert that the doctor is continuing to give under the allowance plan. He will continue to give in the future and while he keenly appreciates the limited federal-state aid that is made available to him through this great emergency, at the same time he accumulates daily experience that impresses him more and more that in federal medicine we have no system which will promote the delivery of either an adequate or a scientific medical service for others of our people. The emergency has proved conclusively that all that has been said of the evils of a state system of medicine has not been over-stated. There may be those so blind to the great contributions of physicians in this national emergency that they will assert that the financial basis that has been established for medical allowances is one that may well carry over into a system of compulsory health insurance. If such persons exist they would betray not only an entire profession into future economic bondage, wilting the flower of scientific progress but, more important, would use their position as leaders to betray a trusting citizenry into a system of medical mediocrity.

Conclusion

I urge upon you the continuation of your great efforts as organized private practitioners to cooperate with the federal government in meeting the medical needs of a large relief group in our population who must depend entirely upon the government and you for that service. And at the same time I would counsel you to make your contribution in such clear and certain terms that the small allowances you receive never may be referred to as pay. For if you gave only such service as was paid for in just and reasonable amount, then indeed would our emergency system for the care of the poor be but a shocking system of poor man's medicine. That it will never be, despite the limits of federal aid, for medicine is a profession wherein the needs of the patient, rather than the relief rules and budget, dictates the service to be given. The code and goal of medicine is the welfare of those it serves and not a standardization of price.

CHOICE OF ANESTHETIC AGENTS AND METHODS AND A SUGGESTION TO FACILITATE BLOOD TRANSFUSION*

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THROUGHOUT the history of modern anesthesia, new agents and new methods for their administration have been recommended until, at the present time, there is a considerable accumulation of agents and methods at the disposal of the anesthetist. Several new agents and methods are being used at this time with considerable satisfaction. From time to time it is well to consider the newly suggested agents and methods in relation to those that are older. A brief review will be attempted.

General Anesthesia by Volatile Agents

Ether, or diethyl oxide, the most reliable and most generally used of anesthetic agents, has enjoyed well-earned acceptance and widespread use throughout the last eighty-seven years. Chloroform was the first of the general anesthetic agents introduced to supplant ether, and although it is still used, especially in obstetrics, in many parts of the world it has fallen into disfavor because of its immediate and remote untoward effects.

The drug which has been introduced most recently to supplant diethyl ether is divinyl oxide, but as yet its use has been limited to a very few hospitals. Ravdin² reported on his results with it, at the University of Pennsylvania, at the meeting of the American Medical Association in Milwaukee in June, 1933. It is said that the agent can be used to produce anesthesia quickly, that it causes good relaxation, that it allows the patient to recover quickly, and that it is generally satisfactory when it is properly administered. It is more potent than diethyl ether and is given in small quantities by either the open drop method or by the gas machine, mixed with a gas. Probably it will be some time before a definite decision is reached as to whether its general use should be widely advocated or not. At present, it is safe to say that diethyl ether is the best of the members of its class of general anesthetic agents. In 1932, at The Mayo Clinic,^{6, 13} there

was a definite increase in the use of ether by the open drop method for the first time since 1922. The open drop method was employed especially when anesthesia was induced with gas and maintained with ether.

General Anesthesia with Gaseous Agents

Of the gaseous anesthetic agents, nitrous oxide is the best established one. It is, no doubt, the best gas for use in extraction of teeth, and for many other surgical operations, especially when inflammability of the anesthetic agent would increase the hazard of the operation.

Ten years ago, ethylene was suggested as a substitute for nitrous oxide and it has been used extensively with great satisfaction. However, it is inflammable and explosive and for that reason its use has been barred from many institutions. On the other hand, it is more potent than nitrous oxide and more oxygen may be given with it than with nitrous oxide. Its use has been particularly advantageous for patients with pulmonary lesions who were compelled to take a general anesthetic.

The gas most recently suggested as a substitute for nitrous oxide or ethylene is cyclopropane, C_3H_6 , a saturated hydrocarbon. HENDERSON and JOHNSTON have used it in the experimental laboratory, and WATERS and his co-workers,¹² of Madison, Wisconsin, have used it clinically. This agent is a gas, but WATERS feels that it should be kept in mind that it is more potent than nitrous oxide or ethylene. It is usually administered in a concentration of 20 per cent or less, mixed with oxygen, and the soda-lime absorption technic developed by WATERS is used. The breathing bag is first filled with oxygen; then a flow of cyclopropane is allowed so that the bag will receive about 500 c.c. of cyclopropane continuously for from three to five minutes, and the flow of oxygen into the bag is about 300 c.c. of oxygen per minute. The oxygen continues to flow in that quantity throughout the period of anesthesia. The flow of cyclopropane

*From the Section on Anesthesia, The Mayo Clinic, Rochester, Minnesota. Read at the meeting of the Hennepin County Medical Society, Minneapolis, Minnesota, November 6, 1933.

is discontinued at the end of the first five minutes, for the patient will become more and more deeply anesthetized after the flow has been stopped. Five minutes after the flow of cyclopropane has been discontinued, if the patient is not sufficiently anesthetized, a flow of 500 c.c. per minute is used for about two minutes, and the flow is then stopped and the patient observed for five minutes. Thus, intermittently, the gas is added to the oxygen in the bag, and if there is no leak in the mechanism (bag, face mask, breathing tubes, and so forth), anesthesia can be maintained at a given level for a considerable time. If the patient becomes deeply anesthetized, respiration becomes very shallow, as it does with ether, and recovery occurs in much the same manner as with a large dose of ether. In other words, there is a considerable margin of safety between failure of respiration and failure of the heart.

Carbon Dioxide Absorption Technic

The soda-lime absorption technic makes for economy, quiet breathing, and retention of body heat. It is based on the principle that the body converts the oxygen into carbon dioxide, that soda-lime will remove carbon dioxide, and that the anesthetic agent undergoes no chemical change in the body and may be used again without losing its original effect. The technic generally used is to establish anesthesia with nitrous oxide or ethylene, with or without ether, and then to arrange the mechanism so that the patient breathes through the soda-lime. The flow of anesthetic agents is discontinued and only that amount of oxygen is used that will maintain metabolism. This scheme of minimizing the amount of anesthetic agent necessary in a given case makes for portability and increases the scope of gas anesthesia within and without the hospital.

Intratracheal Methods

Whenever general anesthetic agents are being given, an adequate airway is of vital importance. Many types of tubes have been suggested and used. The most perfect airway is that advocated by Magill. It is his custom to introduce a large, soft rubber tube through the nose or mouth and through the glottis into the trachea. Frequently the tube can be placed after the patient has been anesthetized; the tube is greased, is passed through the nose, and is allowed to find

its way into the trachea. When the tube continues to enter the esophagus rather than the trachea, a laryngoscope can be used and the tube passed under direct vision.

This method facilitates administration of the anesthetic as well as pulmonary ventilation, and aids in producing relaxation and quiet breathing. It is essential in certain operations such as removal of intrathoracic tumors, operations on the cerebellum, and certain plastic operations on the face and throat. It is desirable in almost any case in which the patency of the respiratory passage cannot be maintained.

Guedel and Waters have suggested the use of an intratracheal catheter surrounded by an inflatable cuff, which when introduced through the mouth into the trachea, and properly placed and inflated, gives the anesthetist complete control of the anesthetic agent as well as of pulmonary ventilation. When the technic suggested by Waters and Guedel is used with the soda-lime absorption technic, the result is the production of satisfactory immediate effects as well as elimination of the possibility of aspiration of material from the nose and throat.

In general, I feel that Magill's intratracheal tube is the one which will enjoy the most widespread use. There is a tendency to use it as a routine, but it would be better to use it in cases in which it is indicated rather than in all cases in which it is not contraindicated.

Rectal Method

Of the agents introduced by rectum the one in most widespread use has been oil-ether, and the method of using this, that of Gwathmey. This method found its greatest use in obstetric procedures, but it has been used also in a great many surgical operations.

In 1926 tribromomethyl alcohol (avertin) was suggested as a substitute for oil-ether, and for a time tribromomethyl alcohol was used to produce full surgical anesthesia. Those who have used it most have decreased the dose, and now it is used for basal anesthesia, to be supplemented by a local anesthetic or by some anesthetic given by inhalation in a quantity much less than that which would be necessary if the supplementary anesthetic was used alone. Tribromomethyl alcohol is a very useful agent, and in time will find its proper place. It is portable, and when used in safe doses the principal danger is of respiratory

obstruction by the tongue. This usually can be avoided by placing the patient on the side during the period of recovery. During operation, it is best avoided by introduction of the Magill intra-tracheal tube.

Intravenous Anesthesia

The intravenous method of anesthesia was attempted with saline solution and ether. More recently, various soluble members of the group of derivatives of barbituric acid have been advocated. The agents used were principally sodium isoamylethylbarbiturate (sodium amytal), sodium secondary butyl-B-bromallyl barbituric acid (pernocton) and pentobarbital sodium. At first it was advocated that full surgical anesthesia be thus established, but it was soon realized that the dose must be reduced considerably and that usually only basal anesthesia should be attempted. At the present time some of these drugs are given usually by the oral route, in small doses. However, both the administration of the barbiturates intravenously and of tribomethyl alcohol by rectum, in doses sufficient to produce surgical anesthesia may be life-saving under certain circumstances such as convulsive seizures from tetanus, poisoning by strychnine, and so forth.

An important use for the derivatives of barbituric acid is the modification or prevention of convulsions that may occur from intravenous administration of a local anesthetic agent. The availability of derivatives of barbituric acid has become so widespread that reports of unusual untoward results may be expected, especially among chronic users of the drugs. Recently, fatal and nonfatal cases of neutropenia with fever and edema of the throat have been observed following the use of amidopyrine⁷ and of the derivatives of barbituric acid.¹⁵ That the drugs have been causative of the condition, however, remains to be definitely proved.

Local, Regional and Spinal Anesthesia

Of the local anesthetic agents cocaine was the first and has been the most widely used. Recognition of the fact that the derivatives of barbituric acid have antispasmodic effect has increased the usefulness of cocaine, which has been, for some time, considered too toxic to be used generally with safety. Many drugs have been synthesized and suggested to replace cocaine. Such agents as stovaine, tropacocaine, halocaine, eu-

caine and procaine have been suggested and tried. Procaine found favor quickly and is the most widely used and probably still is the best, especially from the standpoint of safety. Recently, newer agents have been suggested such as, panto-cain, metycaine and diothane. These agents are especially good in ointments and jells for application on surfaces of the body.

Various methods by which local anesthetic agents may be used divide themselves largely into three types:

1. The anesthetic agent is applied at the site of operation, either by instillation, swabbing, or infiltration. This method has given satisfaction, and in cases in which it is applicable it is without doubt an efficient method of producing local anesthesia, especially by the occasional user.

2. In the so-called regional methods the nerve trunk is blocked at some distance from the site of operation; the most outstanding examples are sacral block, dental block, and field block. Sacral block is particularly advantageous for operations on the anus, and may be used for operations on the perineum. It may also be used for operative obstetrics but usually not in normal labor. It has the advantage over local infiltration in anal operations that it does not distort the part and does give relaxation. It has the advantage over general anesthesia in anal operations that it produces marked relaxation with relative safety. It has the advantage over spinal anesthesia that it does not produce headache of the type that follows lumbar puncture. Brachial plexus block is another type of regional anesthesia. It is much less certain than sacral block, but is excellent when effective. Many other types of block, such as paravertebral block, intercostal block, and nerve block of the extremities, are used for operative purposes as well as for diagnosis, prognosis, and, in some nonsurgical cases, for therapeutic purposes.

3. Spinal anesthesia has been used for about fifty years. Many of the anesthetic agents already mentioned may be used. Of these the best one available is procaine. The usual method of its administration is to dissolve crystals of procaine in spinal fluid and to inject the solution in a lumbar interspace. I now use a 10 per cent solution of procaine in ampules, each cubic centimeter of solution containing 100 mg. of the agent. This is diluted with spinal fluid in the syringe and then injected at the rate of 0.5 c.c.

each second in one of the lumbar interspaces. Many years ago spinal anesthesia was used because of the extreme degree of relaxation which could be produced.

An extreme fall in blood pressure was expected and realized. Untoward results were not infrequent. A wisp of cotton fastened with collodion to the tip of the patient's nose indicated when the respirations ceased, and measures were then instituted to revive the patient. More recently, ephedrine was suggested as a prophylactic agent against fall of blood pressure.⁹ Use of this was carried to extremes, and an attempt was made to keep the blood pressure at normal levels. Relaxation was less than when the blood pressure was not supported. I obtain better relaxation and longer anesthesia when only that amount of ephedrine is used which will maintain a physiologic blood pressure of, say, about 90 mm. of mercury systolic. This may be accomplished by first giving the procaine intraspinally, and then, when the blood pressure has fallen, by slow intravenous administration of ephedrine in sufficient dose, raising the blood pressure to the physiologic point mentioned. However, with considerable experience one may anticipate in certain patients what dose of ephedrine should be given intramuscularly prior to intraspinal injection of procaine so that intravenous injection of ephedrine can be avoided. During the period before operation, the dose of ephedrine I use for the average patient is about 25 mg., given intramuscularly before the spinal anesthetic. The dose of procaine used is about 1 mg. for each pound of body weight of the average person. This dose is reduced when debility from whatever cause is present, and in marked debility the spinal method is avoided. Spinal anesthesia has been advocated for the relief of ileus, especially in the postoperative period. In my experience it has not been satisfactory in the presence of peritonitis. In the practical application of spinal anesthesia it is well to give a safe dose whether or not that dose is sufficient to cause anesthesia for the duration of the operation. If anesthesia is insufficient in depth or duration it may be supplemented by a gas with or without ether. The use of ether given by the open drop method in connection with spinal anesthesia should be avoided, for there seem to be more pulmonary complications following the use of this combination than with most others. Spinal anesthesia may be used as

a diagnostic measure, both in vascular disease¹ and for ruling out pain of central origin.

Artificial Respiration

Artificial respiration for patients who have undergone operations is of interest especially in large medical centers, and a pulmonary ventilator for this purpose has been developed.⁵ Its use is in connection with the intratracheal tube. Recently I have been experimenting on a vest for artificial respiration, and its successful use in a case in which, in an attempt at suicide, the patient administered to himself 6 grains (0.40 gm.) of morphine hypodermically, has been reported by Tovell. There is considerable opportunity in this field for a perfection of apparatus for artificial respiration. The idea of a vest is mentioned to call attention to the need for such a device. The vest is fitted with two rubber bags which can be inflated and deflated by the pulmonary ventilator. With the vest properly adjusted to the patient, during the inflation of the bags the chest is compressed, while during deflation of the bags the chest expands and air is drawn into the lungs.

Blood Transfusion

Blood transfusion is a valuable measure in the care of many patients. Of the two methods, the direct and the indirect, I favor the latter. For years it has been the usual method of transfusion of blood at The Mayo Clinic and has been reported on by Pemberton and associates.¹¹ I am using the method, already established, of adding sodium citrate as an anticoagulant and administering the blood to the recipient slowly in order to avoid chills and other untoward results. The rate of administration is about 15 c.c. each minute.

Two measures which have facilitated blood transfusion in my experience I wish to call to attention. The first is the grading of donor's veins, as poor, fair, good, or excellent, so that in an emergency one may call for a donor with good or excellent veins. The second is that, in any case in which it is expected that blood transfusion or intravenous infusion may be necessary any time in the near future, the skin overlying the good veins in the ankles, arms and backs of the hands of the recipient is marked with a dye so that if the intravascular pressure becomes markedly reduced, and ordinarily the veins would be difficult to find, one may insert the needle through the mark on the skin and more

easily accomplish whatever intravenous injection is necessary.

The Future

I hope I have given some slight idea of anesthesia as it is today. I do not know what anesthesia will be in years to come. However, in this time when young people of fine minds, and their parents, are wondering what use the world will have for them, I would like to suggest that here is a field, replete with possibilities for good, in which much is yet to be discovered.

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THE INJECTION OR NONOPERATIVE TREATMENT OF HERNIA*

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THE injection or ambulant treatment of hernia has unquestionably been established as a valuable type of therapy for a certain group of selected cases of this disorder. This statement is made in spite of the fact that the progress of the development of this type of treatment has been hindered and at times halted by certain possibly unwarranted prejudices which have definitely interfered with a more universal adoption of this both successful and simple method. There is no question but that at one time valid objections to ambulant treatment of hernia existed. Of these the most important was that the first solutions used caused too much inflam-

matory reaction, and an uncalled-for amount of pain. The method, too, soon fell into the hands of irregular physicians who mulcted a gullible public. Their use of paraffin injections, a method which has no relation to the employment of sclerosing solutions, only added further discredit to the injection treatment. And, finally, poor results occurred when the surgeon either lacked or did not apply his skill and patience with patients who frequently required treatment over a long period of time.

The injection treatment of hernia has been extremely slow of evolution but thousands of cures have been reported by the method. A parallel situation has existed in the case of the

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injection treatment of both hemorrhoids and of varicose veins of the extremities—a procedure which has become firmly established.

In the case of hernia there is no form of therapy suitable to all types of cases and it must not be forgotten that surgical procedures have had and always will have a very definite place in their treatment. Operation is not only advisable but is definitely indicated in the permanently irreducible herniæ, in those containing a viscus such as the ureter, gallbladder, uterine tube, uterus, or undescended testis, in the strangulated or incarcerated herniæ, or in those which cannot be continuously and satisfactorily retained by a truss. The remainder, estimated to be as high as 90 per cent of cases (McDonald), are practically all amenable to ambulant therapy, so that this type of treatment actually has a wider field of usefulness than radical or surgical methods.

There is considerable pessimism expressed by some authors as to permanent results from surgical repair of hernia. Although it is usually conceded that recurrences take place in approximately 5 to 10 per cent of all cases, yet it has been stated (Mayer) that this figure comes nearer to being 25 per cent or even more when one considers the fact that after a recurrence has taken place the patient is frequently reluctant to return to the surgeon, and, therefore, the true number of recurrences cannot be estimated. Frequently these patients get along so satisfactorily with the aid of a truss, or even nothing at all, that they seek no further aid.

Historical

The ideal solution to be used for these injections is one which will produce a maximum stimulation of connective tissue, yet be stable, antiseptic, inexpensive, relatively painless, and unaccompanied by danger of slough. Velpeau in 1835 and Pancoast in 1844 used respectively tincture of iodine and tincture of cantharides; Schwalbe in 1877 found 70 per cent alcohol of considerable value; and Heaton in 1878 reported a number of cures by the employment of fluid extract of *Quercus albus*. Janney in 1880, Warren in 1881, and Manley in 1893, reported successful results by similar methods. Lannelongue reported in 1907 on the use of 10 per cent solution of zinc chloride and was convinced that the field of usefulness of the injection treatment was greater than that of surgery. Mestre

of Barcelona in twenty years' experience with more than 10,000 cases reported cures in over 99 per cent. He found that in two or three days following injections there was a barrier of adhesions which was replaced by fibrous tissue, thus effectively blocking the hernial orifice. The injection fluid which he used (called "Hernial") was submitted to the American Medical Association and found not acceptable for New and Non-official Remedies because both the method and the solution were considered to be unscientific, indefinite and possibly dangerous. In 1925, McDonald, after twenty-four years of experience, found that over 90 per cent of herniæ seen by him could be treated by injections with only a negligible incidence of recurrences. Susoni and Astor in 1928, and Wollerman in 1929, reported successful results from this method. The latter author treated 2,949 cases over a period of twenty-four years, obtaining cures in 94 per cent and recurrences in 4.5 per cent. The remainder (1.5 per cent) were improved but not cured. The following year a number of papers were published recommending the injection treatment. In some experimental work Hall observed marked regeneration of striated muscle with new myocytes and regenerating muscle buds after the subcutaneous injection into dogs of alcoholic tinctures of plants whose action he attributed mainly to the tannic acid which they contained. He also reported thirty-three clinical cases successfully treated. Jameson and Cantala treated sixty-four cases with excellent results and found that recurrent postoperative herniæ responded more rapidly because the surfaces of the canal were already roughened and more susceptible to the formation of adhesions. In the foreign literature Campos and Subirachs reported on the use of a solution of sodium salicylate, alcohol, hemp seed and adrenalin. In 240 cases they obtained only 67 per cent cures, but they attributed the high incidence of recurrences to the unsatisfactory physical condition of the patients, many of whom were asthmatics, or suffered from chronic catarrh, obesity, and so forth; in fact many had been refused surgical aid because of their poor general condition. Carros reported six cases in which complications resulted, consisting of local abscesses, orchitis, and recurrence. He states that the effect of these injections is to produce such an enormous amount of sclerotic fibrous tissue that normal anatomic

relations are destroyed. He thought it possible that this fibrous tissue might constrict the ductus deferens and produce sterility. Goldhahn (1930) reported five cases of hernia treated by alcohol

low this treatment. All these patients were under the care of a so-called "Specialist in the Non-Operative Treatment of Hernia," so it is doubtful whether they received proper and skill-

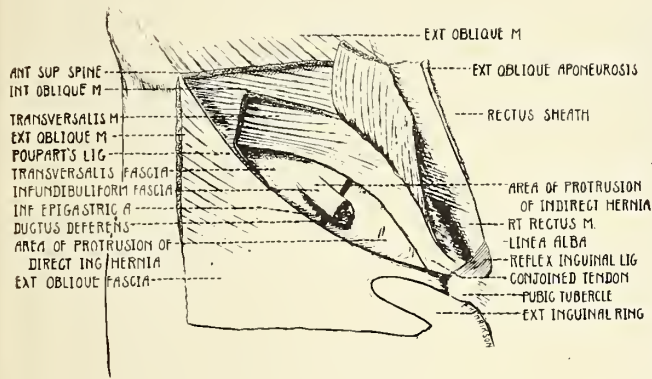


Fig. 1. Anatomy of the inguinal region showing relations of the internal and external rings, and especially the location of direct and indirect hernia.

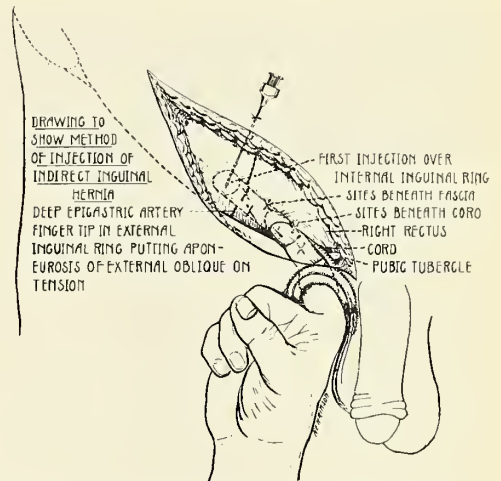


Fig. 2. Method of injecting indirect inguinal hernia. Solution is deposited in fascia at areas marked "X."

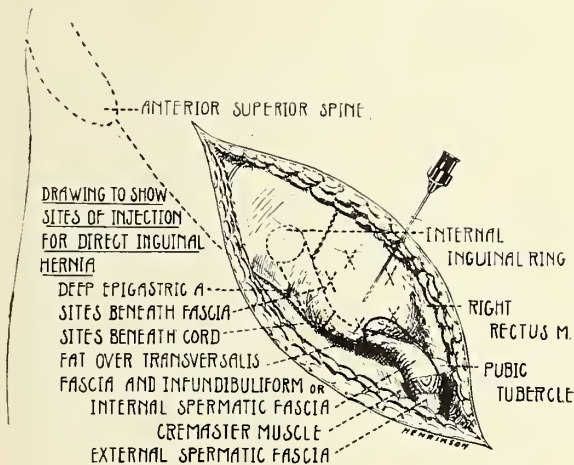


Fig. 3. Anatomy of direct inguinal hernia showing areas of weakness and location of injections.

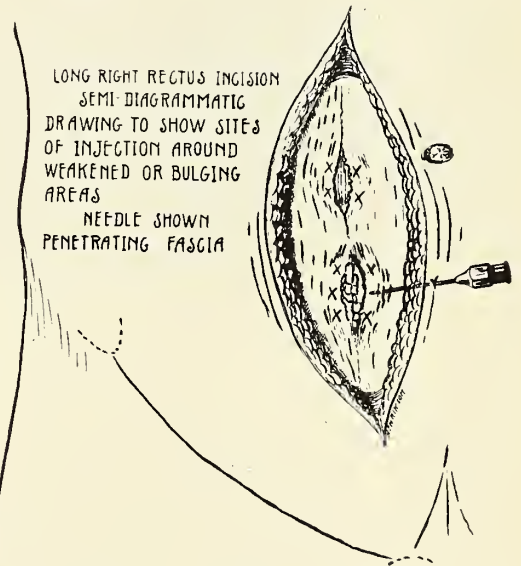


Fig. 4. Locations of injections for postoperative incisional hernia. In this case the fascia had separated in two small areas with no resultant loss of tissue. The results of treatment were excellent, cure being obtained by five injections on each side of each hernia.

injections, two resulting in intestinal fistulae, one in a gas phlegmon and two accomplishing no good whatever. He believed that there is great danger to the structures of the spermatic cord, having seen two cases of testicular atrophy fol-

ful management. Jameson in 1931 again reported successful results and in 1932 La Rochelle conservatively stated that in his opinion the injection treatment should supplement but not displace operative methods. Gray in 1932 reported

cures in eighteen cases and was very enthusiastic concerning the advantages of this treatment.

To produce a maximum connective tissue proliferation, Mayer employed an aqueous solution

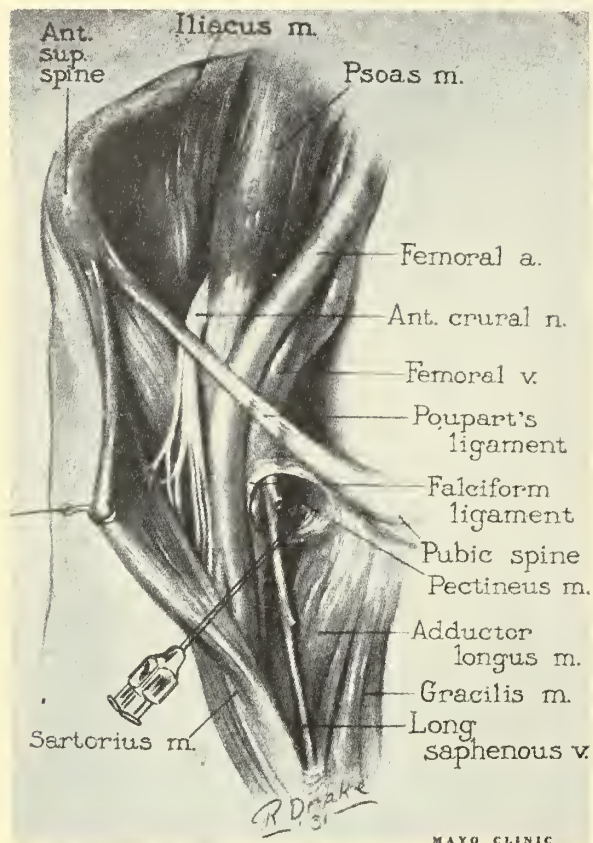


Fig. 5. Position of needle in the injection of femoral hernia. (Modified from Counsellor and Cox.)

of zinc sulphate, phenol, glycerine, cinnamon water, and fluid extract of Canada Pine which in his hands resulted in less than 2 per cent recurrence in the treatment of more than 2,100 cases of hernia over a period of thirty years. Using this same solution, Hall experimentally confirmed these findings on guinea pigs, dogs and monkeys while Wolfe accomplished the same results in rats, each injection being followed by a vigorous proliferation of connective tissue. McKinney investigated the nature of the tissue reaction following injections of a 50 per cent phenol mixture into the inguinal region of dogs, and found the formation of very fibrous young connective tissue without necrosis, hemorrhage or leukocytic infiltration. There was penetration and firm attachment of this fibrous tissue to adjoining muscles. However, experimental evidence as to curability unfortunately is impractical

due to the fact that conditions in animals comparable to those in man do not exist. Rice has recently reported his results with this method using a 50 per cent phenol mixture and has found that complications are few. The most important one he found to be a localized edema and swelling of the neck of the hernial sac, occluding the latter near the external ring and accompanied by an exudation of a clear yellowish fluid into the sac, resulting in a condition similar to that found in a hydrocele.

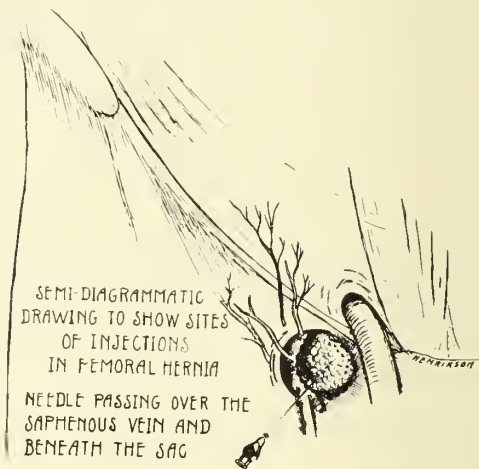


Fig. 6. Femoral hernia with needle directed into pectineus fascia. The hernia must be completely reduced and the saphenous vein retracted laterally before the needle is inserted.

As a general rule it may be stated that any hernia which can be reduced and can be maintained continuously and completely reduced by any mechanical means such as a truss, may be treated by injections. This holds true for umbilical, inguinal, femoral and certain types of postoperative incisional herniæ, making up in all at least 90 per cent of these cases which are seen. For the remaining 10 per cent of herniæ, injections may be used to supplement surgical repair. It has likewise been frequently noted that a hernia which at first will not stay reduced by the use of any type of truss, after a few injections can easily be maintained within the abdomen.

Technic

The object of the injection treatment is to produce a sterile inflammation of the inguinal canal or of the margins of the hernial aperture so that connective tissue proliferation eventually closes not only the defect through which the hernia protrudes, but also the canal itself. Various

types of solutions have been used for this purpose, many of which produce a reaction too severe to be tolerated by the patient, a factor which will discourage the fortitude of the strongest individual.

Strict aseptic precautions must be observed throughout the treatment. A tuberculin syringe with a 1 inch Luer needle of about 23 gauge is used. The solution which has been found most adaptable in our hands for the majority of cases is one made up as follows: Phenol crystals 50 per cent, specific tincture of Thuja 25 per cent, and alcohol 25 per cent. The solution should be filtered before using.

For the first few weeks during the treatments it is imperative that the patient wear a truss constantly, day and night, which at all times maintains complete reduction of the hernia. In the indirect variety, a frame truss fitted with a round pad which covers the internal ring, such as the Smithsonian type, has been highly satisfactory if the condition is unilateral. Where the hernia is bilateral, greater pressure is necessary and, if the patient is obese, a stronger truss must be used. The Hood type of apparatus fulfills these requirements. In the matter of a satisfactorily fitting truss, one cannot be too meticulous. As Bratrud has emphasized, most trusses are fitted too low, holding the hernial contents up but not within the abdomen so that the fascia of the external ring is thinned and frayed as well as resulting in the internal ring becoming enlarged. The truss should maintain a firm pressure on the same area, constantly holding the hernia in reduction and should at all times be absolutely comfortable. By the time the injections have progressed to the point where the hernial contents no longer descend, the patient may be allowed to remove the truss at night or even during the day if he is not up and about. During the period of treatment the patient should carry on his regular work and no harm results as long as the hernia is kept back by the truss and work or exercise is not too strenuous. The truss should be worn for a period of at least six weeks after satisfactory healing has occurred, preferably longer if the patient does heavy lifting or strenuous exercise.

Indirect Inguinal Hernia

The patient lies on his back on a table and the hernia is completely reduced so that the oper-

ator may satisfy himself the inguinal canal is empty. The field is prepared with tincture of iodine, washed off with alcohol, and the internal inguinal ring then located as follows: A line is

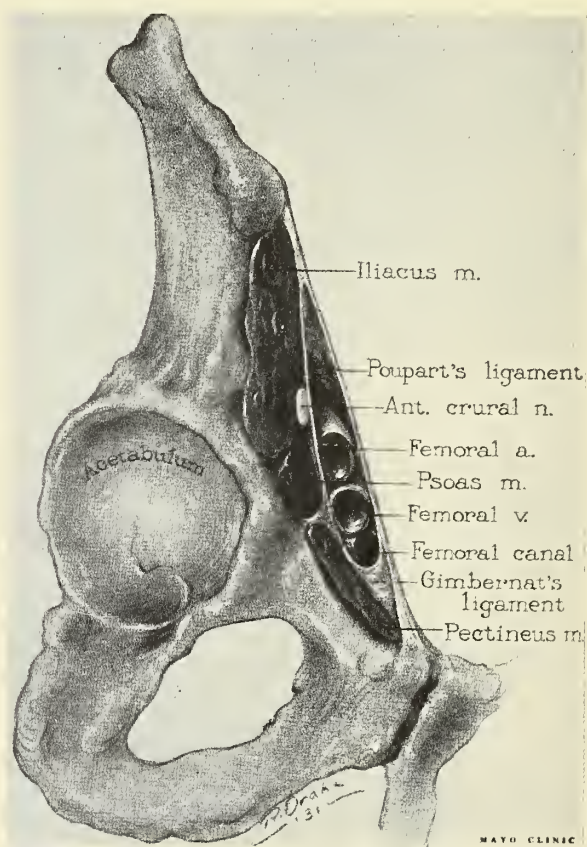


Fig. 7. Anatomical relations of femoral region seen in cross section. Injections of sclerosing solution are made into the medial and posterior walls of the femoral canal. (From Counsellor and Cox.)

drawn from the pubic tubercle to the anterior superior spine of the ilium. About one centimeter above the mid point of this line lies the internal ring. The first injection is then made by inserting the needle just under the fascia so that the sclerosing fluid is deposited at the first portion of the inguinal canal. The direction of the needle should always be downward at an angle of about 45° , never at right angles to the long axis of the abdomen, in order to avoid any possibility of striking the peritoneal fold. Subsequent injections are each made about .5 to 1.0 centimeter farther on down the canal until the margins of the external ring are reached, where several injections are usually necessary. The exact location of the injections about the external ring can be ascertained by holding the

syringe in the right hand while the index finger of the left is invaginated through the scrotal skin in the external ring, making it possible to accurately palpate the point of the needle. A few

cases herewith reported and occurred in about 10 per cent of injections. Other reported complications such as hydrocele, epididymitis, strangulation, orchitis, sepsis, abscess, peritonitis, and

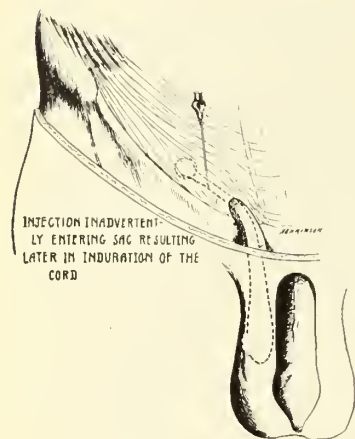


Fig. 8. When the injection fluid is deposited in the substance of the spermatic cord, a thrombophlebitis is induced resulting in induration of tissues and exudation of fluid.

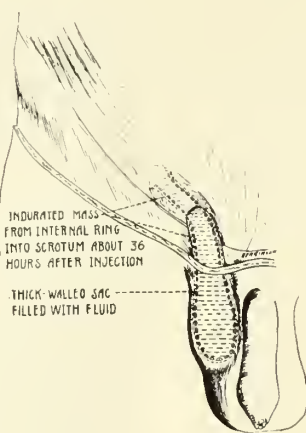


Fig. 9. Exudation of fluid into sac of hernia producing a tender elongated cystic mass. This was the most severe of the complications and occurred in about 10 per cent of cases.

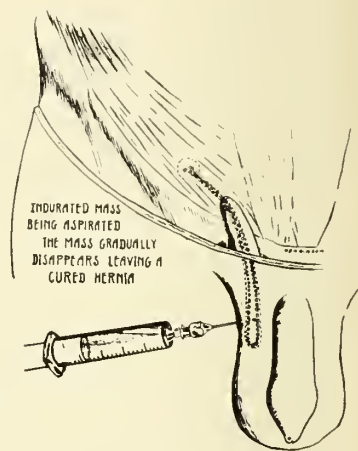


Fig. 10. Aspiration of fluid from so-called case of "indurated cord."

days after each injection of the sclerosing fluid near the external ring one can palpate an increased amount of fibrous tissue, which will gradually tighten the hernial margins as the injections progress.

The dosage of the injections may be varied from 3 minims up to 12 at each sitting, depending upon the tolerance of the patient. Three minims may be injected twice weekly with little likelihood of painful reaction but the process of sclerosis is slow and time is necessary to effect a cure. The injection of 10 to 12 minims weekly is accompanied by an occasional local reaction consisting of pain in the region of the spermatic cord. This is evidenced by swelling and even effusion into the closed off hernial sac, a process which usually takes up to three weeks to subside and frequently necessitates aspiration of the contents. In the presence of such a swelling, the hernia usually stays reduced due to the plugging of the inguinal canal by this enlargement, but may recur as the swelling subsides. Sometimes if the sac is obliterated cure of the hernia results. Occasionally with these reactions it is better for the patient to go to bed for a few days and apply local heat, but in most cases they may be allowed to remain ambulant. This condition was the most serious reaction or complication seen in the

so forth, have not occurred to date. A mild swelling of the cord commonly occurs toward the end of the treatments when constriction of scar tissue takes place, but this always subsides in a short time and has so far not resulted in testicular atrophy in any instance.

In the indirect inguinal group there were 93 individuals with 105 herniæ. Satisfactory results were obtained in 99 of the herniæ with an average of eight injections each. In six instances the hernial opening was too large or there was a chest condition such as asthma or bronchitis which rendered cure of the hernia impossible. In one instance of bilateral hernia twenty injections were given on each side with no apparent improvement. At operation it was found that the opening was too large to expect results from the method.

Direct and Recurrent Inguinal Hernia

These two types of hernia are considered under the same heading since they present more or less the same characteristics and the same problems. In these herniæ two fascial planes must be built up in order to permanently cure the condition, one made up of the transversalis layer, since the weakness here is in the region of the so-called Hesselbach's triangle, and the other in the plane corresponding to that of the fascia

of the external oblique. The internal ring is intact in these herniæ so no injections are necessary here. The sclerosing solution is deposited posterior to and around the spermatic cord in the tissues of Hesselbach's triangle and gradually enough fibrosis is produced so that the next series of injections are made at the margins of the external ring. The site of these injections is determined exactly the same as described above under indirect inguinal hernia. The type of truss which is best used for these herniæ is composed of a longer pad such as the French, covering a large area and held in place by a spring steel frame and groin strap. Direct herniæ require a greater number of injections than do the indirect because the defect to be filled in is larger and there is no oblique canal to facilitate obliteration. Recurrent postoperative inguinal herniæ require fewer than the direct but more than the indirect. As a rule the defect to be filled is equally as great as that in the direct variety but because of the roughening and trauma resulting from the operation tissues are more susceptible to fibrosis, and consequently cure takes place sooner. In this group there were twenty-six individuals with twenty-nine herniæ requiring an average of fourteen injections to obtain satisfactory results. In twenty-eight of these herniæ satisfactory results were obtained but in one the defect was too large to expect cure.

Postoperative Incisional Hernia

Large postoperative herniæ in which there has been considerable loss of tissue following extensive infection, such as occurs from a ruptured appendix, do not respond to this treatment. There usually are many adhesions of the bowel to the abdominal wall, even incarceration of viscera, and there is no definite hernial sac. Where there has been wound separation of not too extensive degree with no loss of fascia, and where the contents of the hernia are easily reducible, good results may be expected although the number of injections required may be considerable. For this type of hernia a satisfactory truss consists of a tight fitting elastic belt, snug enough to hold the hernial margins in apposition. Injections are made into the fascial layers with the needles directed laterally and both sides may be treated at one sitting. It is remarkable how rapidly defects of this type become filled. In

one such case five injections of sclerosing fluid produced an excellent result.

Umbilical and Epigastric Hernia

The method of treatment for these two varieties of herniæ is practically identical to that of the postoperative incisional type. A shorter needle is usually satisfactory and it is possible to accurately palpate the exact site of the injections. Reduction of the hernia can be maintained by a rounded conical pressure pad attached to an elastic abdominal belt. Injections must be given until a firm heavy layer of fibrous tissue is built up. Only one epigastric hernia was accepted for treatment in this series of cases and in this individual an excellent result was obtained with ten injections.

Femoral Hernia

Since the femoral vein lies so close medially and posteriorly to the hernial sac, there is some danger of an accident in these herniæ, so it is important to obviate complications in this location by retracting the vein laterally with the fingers of the left hand and palpating the site of injection with the other. With only a few treatments hernial openings in this location close rapidly. The usual type of truss found to be most satisfactory in femoral hernia carries a round pad fitted over the femoral canal and held in place by a metal spring frame.

Hernia in Children

In the treatment of herniæ in children it is usually best to try conservative measures, such as the use of a truss, for a period of six months to a year. In many instances this will result in a cure, but if this fails and there are no contraindications, injections may be used. It must be remembered that in infants with phimosis, circumcision must first be performed before treatment of hernia is carried out to eliminate the etiological factor of straining. Dosage of the injection fluid should not be over 3 to 4 minims at a sitting, but otherwise the method is the same as that carried out in adults. There were three cases in the present series in which treatment was carried out in children. They were aged 4, 5, and 8 years, and the average number of treatments necessary was five for each individual. The results were excellent.

Contraindications

Besides the contraindications mentioned concerning complicated and irreducible herniæ, it is obvious that in the presence of any constitutional disease such as tuberculosis, lues, diabetes, venereal disease, hemophilia, any condition producing ascites, cardiac complications and malignancy, injection treatment for hernia should not be carried out.

Comment

In the series of cases herewith reported, there has been no mortality and no untoward results except swelling of the cord, as discussed above. This exudation of fluid into the closed off hernial sac may be relieved by aspiration, although it usually is a matter of several weeks before complete recession has taken place because with such a marked proliferation of fibrous tissue absorption is not rapid. There is no doubt as to the presence of a varying degree of thrombophlebitis of the cord accompanying this effusion, although opportunity to verify this has not presented itself. These reactions have been entirely local, never general, and have only occurred in about 10 per cent of injections. The remainder of patients have undergone no pain and no disability except in a few instances there has been a sensation at the time of the injection similar to that of a sharp blow on the testicle. This has always been only transitory and has never been a serious objection by any individual. Several patients have complained of a transient sharp shooting pain down into the head of the penis but this likewise has never been severe. The mechanism of this pain is undoubtedly a stimulation of some of the small sensory nerve fibers accompanying the vessels of the spermatic cord.

Criticism has been made that the injections are a blind procedure and that there exists great danger of injury to the bowel, omentum, peritoneum and blood vessels. However, when care is used in the selection of proper cases as well as in the technic of injection and when the anatomical relations are kept clearly in mind, there should be no reasonable chance of the occurrence of such accidents.

The possibility of producing sterility cannot be casually dismissed as an impossible complication, because with the formation of scar tissue, especially if it involves both the structures surrounding and within the spermatic cord, obstruc-

tion to the ductus deferens or to its blood supply can conceivably occur. However, with care in placing the injection fluid in the fascial layers and not in the cord itself, this possibility seems not only remote but likewise no greater than that following surgical repair. It is a question which time alone will answer.

No harm results from the injections should this method fail and surgery be subsequently necessary. There is no mutilation of tissues; in fact it has been stated by some authors that with the formation of larger amounts of connective tissues, surgical repair is actually facilitated, although of course it is impeded somewhat technically because of adherent structures. Since the patient has continued to be ambulant with no hospital expenses incurred there is little economic loss should operation finally be considered.

In this series of cases there were treated 93 patients with 105 indirect herniæ, and one case each of epigastric, femoral, and postoperative incisional herniæ. This makes a total of 122 patients with 137 herniæ. In 128, or 93.5 per cent of these cases, cure was obtained, but in judging these cures it must be remembered that cases were treated just as they were admitted, regardless of the size of the hernia or the age of the patient, but of course with the exclusion of those individuals who presented contraindications of either a general or local nature.

There is no doubt that when cases for injection treatment are selected with care the percentage of cures can be greatly increased, because practically all the failures in this series occurred either in individuals who presented herniæ unsatisfactory for treatment or who were uncooperative in continuing treatment for a sufficient period of time.

Summary

The injection treatment has definite indications in the therapy of selected cases of hernia. In general the indirect inguinal herniæ which are small, completely and continuously reducible, contain no viscus and occur in a young or middle aged individual without any constitutional disease offer the best prognosis for cure. Results are less satisfactory in the treatment of other types of hernia, especially if the defect is large or if the patient is elderly. Definite and absolute contraindications to the injection treatment exist when the hernia is irreducible, strangulated

or cannot be maintained in position by a truss, or in the presence of lues, tuberculosis, hemophilia, malignancy, ascites and cardiac complications.

Complications of this treatment are few and

consisted in this series of cases, mainly, of a swelling and induration of the cord. Occasionally there was an associated effusion of fluid into the hernial sac which subsided in a short time after aspiration.

TRANSFUSION: A COMPARISON OF RESULTS OBTAINED BY BLOOD GROUPING AND DIRECT MATCHING*

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A CONSIDERABLE number of observers still feel that it is unsafe to perform transfusion of blood if only the agglutination groups of recipient and donor are known. They advocate direct matching of blood of recipient and donor.

The work on which this paper is based was done at The Mayo Clinic in 1926. All of the transfusions concerned were performed on the basis of Moss agglutination groups only, using the sodium citrate method. This was considered perfectly safe. Nevertheless, because of the criticisms that had been levelled at this procedure, it was determined to find out also what direct matching of the blood of recipient and donor would show. If, as compared with the proportion of reactions in the entire series of transfusions, the proportion of such reactions is smaller in that portion of the series in which direct matching indicated perfect compatibility, and larger in that portion of the series in which direct matching indicated imperfect compatibility (or incompatibility), it would be demonstrated that the criticisms had foundation; if not, it would be demonstrated, within the limits of the series studied, that determination of Moss agglutination groups was as satisfactory a preliminary to transfusion as was direct matching. Accordingly at the time of transfusion, which, as has been said, was done on the basis of Moss groups only, specimens of the blood of recipient and of donor were taken and sent to the laboratory for direct matching.

Two hundred transfusions were given to nine-

ty patients. The number of transfusions given to each patient varied from one to eleven. A careful record was made of the reactions noted. Records were made of rise in temperature (a rise of 2° F. was recorded as a reaction), presence of chill, chilly sensations, nausea, vomiting, headaches, sweats, itching, dizziness, urticaria, jaundice, hemoglobinuria, herpes, and anaphylactic phenomena (Table I). In many instances two or more of these phenomena were observed following a given transfusion. In many cases the anemia was severe and in the average case the concentration of hemoglobin was less than 30 per cent, and erythrocytes numbered less than 2,000,000 in each cubic millimeter of blood. A summary of the results as far as reactions are concerned is shown in Table II. From the table it is evident that reactions developed following fifty-one of the 200 transfusions (25.5 per cent). This represents a much higher percentage of reactions than one would expect in a series of this type, due to the fact that every abnormality noted following transfusion was recorded as a reaction. This meticulousness was in the interest of fairness. If every phenomenon which could possibly be considered an evidence of reaction was recorded, no instance of reaction would be overlooked.

It has been said that at the time of transfusion specimens of blood of recipient and donor were sent to the laboratory for direct matching. The results in the laboratory were as follows: In no instance was there agglutination when the patient's serum was added to the donor's corpuscles, but rouleaux formed in twenty-one cases (10.5 per cent). When the donor's serum was

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TABLE I. TWO HUNDRED TRANSFUSIONS: REACTIONS MOSS GROUPING

Diagnosis	Cases	Transfusions	Fever, + 2°	Chills	Chilly sensations	Nausea	Vomiting	Headaches	Sweats	Itching	Dizziness	Urticaria	Jaundice
Pernicious anemia	51	137	29	28	6	14	10	9	9	2	2	1	1
Secondary anemia	20	29	2	3	0	0	0	0	0	0	1	0	0
Cancer with anemia	12	18	2	1	0	0	0	0	0	0	0	0	0
Leukemia	5	13	1	0	0	0	0	0	0	0	0	0	0
Splenic anemia	1	2	0	0	0	0	0	0	0	0	0	0	0
Hemorrhagic purpura	1	1	0	0	0	0	0	0	0	0	0	0	0
Total	90	200	34	31	6	14	10	9	9	2	3	1	1

TABLE II. COMPARISON OF REACTIONS: MOSS GROUPING AND DIRECT MATCHING

Diagnosis	Cases	Whole series. Moss method indicated compatibility		Portion of whole group. Direct matching indicated perfect compatibility*	
		Transfusions	Reactions	Transfusions	Reactions
Pernicious anemia	51	137	43	94	33
Secondary anemia	20	29	5	20	3
Carcinoma with anemia	12	18	3	12	1
Leukemia	5	13	0	11	0
Splenic anemia	1	2	0	2	0
Hemorrhagic purpura	1	1	0	1	0
Total	90	200	51 (25.5 per cent)	140	37 (26.4 per cent)

*In the sixty cases in which direct matching indicated incompatibility, the proportion of reaction was only 25 per cent.

added to the patient's corpuscles, agglutination appeared in thirteen instances (6.5 per cent), and rouleaux formed in thirty-seven instances (18.5 per cent). These quantities seem to add to seventy-one transfusions, but this is because two phenomena were seen in some instances; actually sixty transfusions are represented, as will appear. Of the twenty-one instances in which rouleaux formed when the donor's corpuscles were added to the patient's serum, no reactions occurred in eighteen instances; chill graded 2 occurred in one, headache in one and nausea and vomiting in one. Of the thirteen instances in which agglutination occurred when the donor's serum was added to the patient's corpuscles, in eight the donor was of Group IV. Of these eight instances, four of the recipients were of Group

II, two of whom had chills graded 1, three of the recipients were of Group III, and one recipient could not be definitely grouped. No reaction occurred in the latter subject or in the three subjects in Group III. In three of the thirteen instances, the recipient was of Group I (universal recipient); in two of these the donor was of Group II, and in one, of Group III, and in the latter subject, a slight headache followed the transfusion. In the two remaining instances of the thirteen, representing one patient who received blood from two donors in the course of seven transfusions, both donor and recipient were of Group III. This particular subject, aged thirty-six years, had no reactions from transfusion (Table III). Moreover, in only three of the thirteen instances in which aggluti-

TABLE III. MAN AGED THIRTY-SIX: PERNICIOUS ANEMIA

Date, 1926	Patient's blood			Donor's blood, group	Patient's serum, and donor's corpuscles	Patient's corpuscles and donor's serum	Temperature before transfusions	Maximal temperature after transfusions	Reactions
	Hemoglobin, per cent	Erythrocytes, millions	Group						
1-23	16	0.88	III	III	Rouleau formation, graded 1	Rouleau formation, graded 4	99.0	100.0	0
1-30	20	1.15	III	III	Rouleau formation, graded 4	Agglutination	99.4	99.6	0
2-6	20	1.27	III	III	Rouleau formation, graded 4	Agglutination	99.0	99.0	0
2-26	25	1.27	III	III	Rouleau formation, graded 1	0	98.4	98.6	0
3-17	22	1.63	III	IV	0	Agglutination	99.0	100.8	0
3-26	20	1.27	III	III	Not tested	Not tested	98.2	98.4	0
4-7	48	2.30	III	III	Rouleau formation, graded 1	Rouleau formation, graded 4	98.0	99.8	0
500 c.c. blood given at each transfusion									

nation was recorded, did reaction take place clinically. Of the thirty-seven instances in which rouleaux formed when the donor's serum was added to the patient's corpuscles, no reactions were recorded in twenty-nine, chills graded 1 to 3 occurred in seven and nausea and vomiting in one. It is well known that formation of rouleaux is not considered by advocates of direct matching as evidence of incompatibility. In this work, however, just as every possible evidence of clinical reaction was recorded, so every conceivably possible evidence of incompatibility in vitro was recorded, and for the same reason.

In sixty instances mentioned in the preceding paragraph, the donor's and recipient's blood were incompatible by direct matching; perfect matching was obtained in 140 instances. The clinical results, relative to reaction, in these 140 transfusions are given in Table II.

In the sixty instances in which the patient's and donor's blood were incompatible by direct matching, as evidenced by agglutination of the patient's corpuscles by the donor's serum or by formation of rouleaux following the matching of the donor's corpuscles and the patient's serum, and the donor's serum and the patient's corpuscles, reactions were observed in fifteen instances (25 per cent).

Therefore, approximately the same percentage of reactions was observed in the whole series of 200 transfusions (25.5 per cent) in that portion of the whole series consisting of 140 transfusions (26.4 per cent) in which direct matching indicated compatibility, and in that portion of the whole series consisting of sixty transfusions (25 per cent) in which direct matching indicated incompatibility.

This is not a large series of transfusions, but probably represents a fair sample of the transfusions which have been given at the clinic, and indicates clearly, at least in this series, that direct matching of patient's and donor's blood is no greater safeguard against clinical reaction from transfusion than is use of the Moss groups. In the state of present knowledge regarding blood groups, subgroups and serologic reaction, undoubtedly reactions will continue to occur from time to time for which no adequate cause can be determined, regardless of whether Moss grouping or direct matching is used in selecting donors, and even though all of the criteria for giving a transfusion have been met.

Discussion

A. H. SANFORD, M.D., Section on Clinical Pathology: As Dr. Horton has stated, this study was made seven years ago. The experiences of the intervening period do not change our opinion of his conclusions.

Unger, in 1921, published a paper in the *Journal of the American Medical Association* entitled, "Precautions necessary in the selection of a donor for blood transfusion." He stated, "It is unsafe to perform a transfusion, relying simply on the fact that donor and patient are of the same group. Preliminary to transfusion, the blood of every patient should be grouped and then tested directly against that of the prospective donor." He did not raise the question as to whether a method of transfusion in which the blood is given rapidly to the recipient might not also be responsible for reactions. His work is of value in pointing out the existence of a condition which was shortly afterward studied by Guthrie and Huck.

Coca, in 1923, described a new pair of iso-agglutination elements in human beings of the subgroup type. He stated that the finding of new pairs "has revealed an unsuspected complexity of constitution of the known groups, without, however, changing their practical mutual relationship with regard to blood transfusions." On this basis we have continued to transfuse blood, relying solely on blood groups, using in emergencies the universal donor, and have not done direct matching except on rare occasions when the patient had some severe blood dyscrasia.

In the last eighteen years there have been performed at the clinic more than 15,000 transfusions with this

method of selection of donors. Dr. Horton's group of 200 transfusions is a small sample to be sure, but it does indicate that direct matching would have been of no particular benefit in the avoidance of reactions.

A recent paper by Elser and Stillman entitled "The fetish of triply distilled water" emphasized the very important necessity of giving any intravenous solution very slowly if reactions are to be avoided. These authors stated that "solutions introduced directly into the circulation, other than physiologic solution of sodium chloride, should be administered at a rate not to exceed 5 c.c. per minute."

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THE CONTAGIOUSNESS OF TYPES I AND II PNEUMOCOCCUS PNEUMONIA*

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THE results of numerous investigations show that pneumonia due to type I or to type II pneumococci is practically always an exogenous infection;³ that is, bacteria are conveyed to a susceptible individual from outside sources, chiefly in exhaled droplets from patients ill with the disease or from healthy carriers. Pneumonia due to type III pneumococci may also be exogenous in origin,¹ but is more often an endogenous infection due to the invasion of this type of pneumococcus which is present normally in the nasopharynx in a high percentage of healthy persons. Pneumonia due to pneumococcus of types IV to XXXII is almost always endogenous in origin and is seldom contagious.⁴

Pneumonias due to types I, II or III pneumococci are not ordinarily treated as contagious diseases. They are certainly not as contagious as

measles, for example. Clinical lobar pneumonia is usually treated in homes or in hospital wards without exercising precautions to prevent contact infection among the attending personnel or other patients, although Cole has for years advocated strict isolation technic. In spite of this neglect, examples of direct contagion are uncommon. Indeed, in most cases of lobar pneumonia, it is impossible to trace the source of infection. Nevertheless, instances occur from time to time in which contact infection is practically certain. Small epidemics of type specific pneumococcus pneumonias have been observed. Robertson⁵ reported the instance of a laboratory technician who developed type I pneumococcus pneumonia 30 hours after handling a culture of type I pneumococcus and five months later developed type II pneumonia forty hours after exposure to type II pneumococci. Cruickshank² briefly mentions seven instances of contact infection of types I and II

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pneumococcus pneumonia and five instances in which the convalescent carrier was presumably the source of infection.

It seems of interest, therefore, to report six examples of contagion in type I or II pneumococcus pneumonia which I have observed during the past nine years. Evidence of contagion is fairly conclusive in all. In each instance there was close contact between the source and the recipient; in four instances the recipient became suddenly ill during the illness of the patient first affected, and in each case the pneumonia in the recipient was caused by the same type of pneumococcus as that found in the patient from whom the disease was contracted.

Case 1.—Mrs. V. F., a nurse, thirty-eight years of age, had attended a patient ill with pneumonia for about a week. She began to feel ill on February 22, 1924, and was obliged to retire from service. On the following day, a sudden sharp pain occurred in the left axilla. She became worse and was admitted to the Hospital of the Rockefeller Institute on February 26. A diagnosis of type II pneumococcus pneumonia was made. The pneumonia was confined to left upper and lower lobes. Blood cultures were sterile. She recovered and was discharged March 22.

Sputum was obtained from the patient she had nursed and inoculated into a mouse. Type II pneumococci were obtained from the peritoneal exudate.

Case 2.—Miss M. W., aged twenty-three, had had a cold for about two weeks. She noted chilly sensations on February 12, 1925, felt ill and went to bed. The same day pain in the chest, cough and bloody sputum was noted. She was admitted to the Hospital of the Rockefeller Institute forty-eight hours after the onset. Pneumonia of the right lower lobe and bacteriemia due to type I pneumococcus were present. She was treated with type I antipneumococcus serum, recovered, and was discharged March 6.

Case 3.—Mrs. P. W., aged fifty, the mother of the previous patient (Case 2) was in good health at the time of the onset of her daughter's illness on February 12. She acted as her nurse until February 14 when she experienced chilly sensations. She became worse, developed pain in the right infrascapular region and coughed. The patient was admitted to the hospital thirty hours after the chill. There was pneumonia of the right lower lobe. The blood culture was sterile, but the urine contained type I specific soluble substance. She was treated with serum and recovered uneventfully.

Case 4.—Dr. B. R., a physician, aged fifty-three (record obtained through the courtesy of Dr. B. D. Bowen), developed chills October 15, 1929. The following day severe pain in the chest was noted. He was admitted to the Buffalo General Hospital as a patient of Dr. I. P. Lyon. There was consolidation of the right lung, empyema and bacteriemia due to type II pneumococci. The patient died October 25.

Case 5.—Mrs. B. R., aged forty-nine, the wife of Dr. B. R. (Case 4) was in constant close attendance and under extreme nervous tension. She returned to her home physically and mentally exhausted on October 24. The next day high fever was noted. She was admitted to the hospital extremely ill with consolidation of the right lung and bacteriemia due to type II pneumococci. She expired on the fifth day of illness.

Case 6.—History obtained from Mr. J. K. (Case 7). Mrs. M. K., aged twenty-five, developed a cold while on an extended automobile trip. About February 23, 1931, she became much worse and was admitted to a hospital in New Hampshire in a moribund condition on February 26. There was consolidation of the whole right lung. The patient died three hours after admission. The sputum was not typed.

Case 7.—Mr. J. K., the husband of the patient just reported (Case 6), returned to Minneapolis, March 1. He had a cold and on March 2, after the funeral of his wife, developed a chill, pain in the chest, cough and bloody sputum. He was admitted to the Northwestern Hospital March 4, as a patient of Dr. A. H. Beard. There was pneumonia of the right middle and lower lobes and left upper lobe due to type I pneumococcus. Recovery ensued.

Case 8.—Mrs. H. S., aged forty-one, a sister of the preceding patient (Case 7), had a cold, but nursed her brother until he entered the hospital. She became worse the day following and was admitted to the same hospital March 6. There was pneumonia of the right lower lobe, due to type I pneumococcus. Empyema developed, but she recovered eventually after a prolonged course.

Case 9.—Mrs. C. M., aged forty-eight, a patient of Dr. F. E. Murphy, who kindly supplied the record, had an attack of acute cholecystitis about December 13, 1932. On December 14, temperature of 103° was noted and pneumonia of the left lower lobe due to type I pneumococcus developed. Although she was given five doses of antipneumococcus serum she expired on December 22.

Case 10.—Mr. C. M., aged fifty, the husband of Mrs. C. M. (Case 9), had been in constant attendance at his wife's bedside although he had a severe cold. On January 1 he developed a chill followed by cough and bloody sputum. Pneumonia of the left lower lobe due to type I pneumococcus was present. After five doses of antipneumococcus serum the patient recovered.

Comment

These cases demonstrate the importance of regarding pneumococcus pneumonia, especially that due to types I or II, as a contagious disease. They further emphasize the necessity of devoting attention to the prevention of infection among other members of the family who are usually worried and become exhausted from attending the patient, often to the state of diminished resistance to infection. Noteworthy in this respect is the fact that although numbers of persons

came in contact with the patients described, only a few became infected and each of the latter suffered some indisposition at the time. It is probable, considering the epidemiological studies of Stillman,⁷ Rosenau, Felton and Atwater,⁶ Strøm⁸ and Gundel that many of the persons who came in contact with the patients became transient carriers of the type of pneumococcus disseminated in the patient's exhalations. Pneumococci were apparently unable to invade healthy individuals with adequate resistance, but in those whose resistance was sufficiently diminished by colds, fatigue or other factors, invasion occurred and pneumonia developed. It is evident then that the coincidence of several factors is required before pneumonia occurs, namely, (a) a source of virulent organisms, (b) the means of conveyance of the organism from the source to a susceptible host and (c) a susceptible host.

It is, furthermore, necessary to abandon the concept of the enhancement of virulence as the pneumococcus passes from host to host as a prerequisite of invasiveness. The pneumococcus, especially that of type I or type II, shows slight if any fluctuation of virulence, as far as can be measured, whether it is obtained from healthy carriers, or from patients ill with pneumonia or convalescent from it. It is therefore necessary to regard diminution of host resistance of greater importance than increase of virulence of the bacterium in the epidemiology of pneumococcus pneumonia.

The question may arise as to whether it is valid to conclude that in each of the examples of contagion cited, infection was transmitted directly from the one patient to the other or whether both became infected from a third source or if both were merely coincidental and unrelated accidents. It is impossible to establish any of these possibilities absolutely, but it is highly probable that contagion was transmitted from the first patient to become ill to the second person in each group. Patient 1 did not come in contact with the patient she attended until after he had become ill. The same pertains in cases 3 and 2.

The sequence of events in cases 6, 7 and 8 is further suggestive of the direct transmission of infection from one person to another, although 4 days elapsed between death in case 6 to the onset of illness in case 7.

Summary

Six examples of contact infection of pneumonia due to type I or type II pneumococci are recorded. In most cases, persons contracting the disease from patients were not in the best of health. Although pneumonia due to types I and II pneumococci is not as contagious as certain other infectious diseases, it is, nevertheless, transmissible from one person to another. It is important for attendants to exercise precautionary measures to prevent contagion when in close contact with patients, especially if suffering in disposition such as results from fatigue or from upper respiratory infections.

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CASE REPORTS

SCURVY*

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Patricia Anne, nine months of age, was seen at the Mankato Clinic in July of last year. The family history was negative. At birth she weighed 8 pounds and 4 ounces, and delivery was normal. The baby made the average gain from birth, being bottle fed on milk and dextrimaltose mixture. She was given cod liver oil from the first month. She did not have orange juice until the fifth month, and then irregularly. She was on pasteurized milk, and only a small amount of vegetables.

On July 24, 1933, the baby began to cry a good deal when moved, especially when the lower extremities were moved—more so upon moving the left leg. The condition came on gradually, and when seen, there was inability to move the legs; this was probably on account of pain. She slept well, and seemed normal, except when moved. She took her food well and the bowels were normal.

On physical examination the baby looked healthy, her color was fair and turgor was excellent. Both limbs were drawn up and turned slightly outward. No swelling or local points of tenderness were found. There was normal mobility of spine and hips. The temperature was normal. Reflexes were normal and the Chvostek negative. The baby had seven teeth. The throat, ears, heart, lungs, and abdomen were negative. The hemoglobin was 60 per cent; the white blood count 10,000. Urine examination was negative. The Mantoux test was negative. X-rays of the spine and extremities were negative. However, two weeks later, after the baby had been on treatment, the film showed definite calcification and subperiosteal hemorrhage at the lower end of the left femur; also a slight increased density of the epiphysis and slight spurring. The diagnosis was made of healed scurvy.

A differential diagnosis lay between tuberculosis, injury, infantile paralysis, multiple neuritis, osteomyelitis and periostitis and scurvy. The slow onset, the unwillingness to use the legs, the pain on motion, and the position in which the legs were held (as seen by the x-ray film), were almost pathognomonic of scurvy, and justified that diagnosis without any further evidence. The prolonged use of boiled milk, together with the irregular giving of orange juice, helped to corroborate the diagnosis.

In the July number of the American Medical Association Journal in an article by Dr. Nelson of Cincin-

nati, this point is brought out, namely that subperiosteal hemorrhages in infantile scurvy may not be visualized in the roentgenogram until calcium salts are deposited in the periosteum. This deposition depends upon the administration of Vitamin C. When the roentgenogram demonstrates that calcium is present in the periosteum surrounding the hemorrhage, it indicates that Vitamin C has been given, and that healing is proceeding. Unless serial roentgenograms are taken after the administration of Vitamin C, the diagnosis of subperiosteal hemorrhage may be overlooked.

At the time the diagnosis was made in this infant, there was no visible sign of scurvy. The only way that a diagnosis could be arrived at was by exclusion. The diagnosis was clinched, however, by the treatment; after crowding the orange juice, cod liver oil, and viosterol, and giving the child unpasteurized milk and radiation with the alpine light, she improved rapidly, so that in less than a week the pain was gone and the baby could be moved without crying.

At present she moves her legs freely, and is gaining in weight.

FOREIGN BODY REMAINING IN PERITONEAL CAVITY AFTER OPERATION

Extraction Through Drainage Tube by Means of Esophagoscope

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Greenhill found, in study of 109 cases in which a foreign body was left in the peritoneal cavity after operation, that the mortality rate was more than 17 per cent. The frequency of this surgical complication is impossible to ascertain, for there is a striking discrepancy between the information obtained from insurance companies and that gleaned from medical literature.

Although such foreign bodies usually are removed by laparotomy, recently, at The Mayo Clinic, we had the opportunity to remove such a body by use of an esophagoscope introduced through a postoperative sinus. A review of the literature failed to disclose a previous report of such a case.

Report of Case

A man, aged fifty-four years, had been operated on elsewhere nineteen hours after the onset of symptoms for acute appendicitis; the surgeon was experienced and capable. At operation, a great quantity of seropurulent fluid was withdrawn from the pelvis and peri-

*Presented before the Northwestern Pediatric Society in connection with the annual meeting of the Minnesota State Medical Association, Duluth, July 16, 1934.

*From the Division of Medicine, The Mayo Clinic, Rochester, Minnesota.

toneal cavity by means of a Poole suction tube. The appendix was found imbedded in the pelvis and matted down by inflammatory adhesions. It was gangrenous throughout, with a perforation toward the tip. When closing the abdomen, it was noted that the tip of the Poole aspirating tube was missing. A thorough search

the abdomen revealed the presence of the foreign body on the right side, just anterior to the fifth lumbar vertebra (Figs. 1 and 2). After consultation, it was thought advisable to make an effort to remove the foreign body by means of an esophagoscope. Without anesthesia, a small Breuning esophagoscope was intro-



Fig. 1. Situation of aspirator tip; anteroposterior view.



Fig. 2. Same as Figure 1; lateral view.

was made of the dressings and abdomen, but the tip could not be found. On account of the patient's condition, it was deemed inadvisable to carry the investigation further at that time. The abdomen was closed, and a large drainage tube of split rubber was left in the wound. Convalescence was rapid and satisfactory.

Roentgenograms made of the abdomen ten days after operation revealed the tip of the tube within the abdomen at a point above the brim of the pelvis. The possibility of removing the foreign body by means of an electromagnet was considered, but was not found feasible, for tests demonstrated the suction tube was not magnetic. The following day with the patient under anesthesia a protracted search was made for the foreign body, by means of dressing forceps introduced through the drainage tube and through the operative wound, but this was unsuccessful. The drainage tube was permitted to remain in place. Roentgenograms taken six days later still showed the foreign body to be in the same place. The following day, the patient was brought to the clinic by his physician for further investigation.

The patient was found to be in excellent condition; a split rubber drainage tube was present in the right lower quadrant of the abdomen. Roentgenograms of

duced through the drainage tube into the peritoneal cavity. By means of a fluoroscope and with the assistance of Dr. Camp, the esophagoscope was directed toward the foreign body. It was necessary to displace two loops of bowel; following this the esophagoscope encountered an inflammatory mass lying against the spinal column. With forceps an opening was made through the mass and the foreign body was located; it was then readily extracted with the esophagoscope. The patient recovered uneventfully and was permitted to return home the next day. He stated that the procedure caused him no discomfort.

The case is of special interest, as it presents an easy and satisfactory means for carrying out such a procedure; the patient is spared the necessity of laparotomy, with its greater difficulty of locating the foreign body, especially when of small size, and when the fluoroscope cannot be used.

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EDITORIAL

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BUSINESS MANAGER

J. R. BRUCE, Saint Paul

Volume XVII DECEMBER, 1934 Number 12

Amidopyrine and Agranulocytosis

Warnings have come from various sources of the occurrence of agranulocytosis following the taking of amidopyrine and allied drugs. The report by Jackson in the October number of the *American Journal of Medical Sciences* is one in point. Of his series of twenty-seven cases, seven were tentatively considered by the author to have been caused by these drugs. Five of the seven patients received pentonucleotide treatment and recovered. The remaining two received no treatment and died. Of three patients who continued to take amidopyrine, one died and two, rather inconsistently, recovered. One who continued to take the drug continued to have attacks, while a number took amidopyrine and allonal after an attack without effect on the white blood corpuscles. While evidence of this sort is not conclusive, it is most suggestive.

The significance of the warning is that it would be wise not to administer to a patient with agran-

ulocytosis a drug containing the phenol radical, which is probably the dangerous constituent.

The average physician is content to prescribe a sedative without knowing the chemical composition of the drug. In view of the apparent effect on the white blood cells of at least some of the numerous hypnotics on the market today, it is essential that the composition of some of those more commonly used be known. The Federal Food and Drugs Act does not require the labeling of the composition of hypnotics and certainly there is no excuse for prescribing remedies of unknown composition.

Antipyrine, acetanilid and amidopyrine (pyramidon) all contain the phenol radical. The popular and effective allonal is a mixture of amidopyrine and barbituric acid. We know of one instance where a young woman took twenty-five allonal tablets with suicidal intent, but with no deleterious effects following prompt treatment. Migraine is a mixture of antipyrine and caffeine citrate.

Phenobarbital (luminal), as the name indicates, contains the phenol radical. In spite of the marked increase in the sale of this popular sedative, forty-five thousands of pounds said to have been sold in 1932, we have encountered no report of an instance in which the remedy presumably caused an agranulocytosis. Among the barbiturates which do not contain the phenol group may be mentioned barbital (veronal), diallylbarbituric acid (dial-Ciba), N-Butylethylbarbituric acid (neonal) and amytal.

Sulphonemethane (sulphonal) and sulphonethylmethane (trional) belong to a different group of hypnotics which do not contain the phenol radical. Carbromalum (adalin) is bromidiethylacetylurea and is also free of the phenol group.

The toxic effect of alpha dinitrophenol on the white blood cells deserves special mention in view of its recent vogue as a reducing drug. Two instances of death following its use have been reported in which destruction of the white cells was outstanding.

Valuable as these hypnotics are, some restriction should be placed on their sale. At present they may be purchased in almost any amount

over the drug store counter. The barbiturates have taken front place in Paris as a means of attempted suicide according to Flandin. Their sale should be limited to prescription by a physician.

Christmas Seal—1934

Dr. Edward Livingston Trudeau, a great physician, who fifty years ago initiated the sanatorium movement when he built "The Little Red" cottage in the Adirondacks, is honored by the 1934 Christmas Seal.

This commemorative Seal, dedicated to honor a great physician, brings to our attention the fact that The National Tuberculosis Association and its branches was founded, developed and is directed by the medical profession. Now, when this closely affiliated organization is making its annual appeal for funds through the 1934 sale of Christmas Seals, it is timely for members of our profession to consider the close identity of interest which has existed for the past twenty-seven years between tuberculosis associations and the practising physician.

To interest the private physician in the diagnosis and care of tuberculosis and to urge the public to consult the private physician has been the primary object of the tuberculosis association. No other public health agency so directly and certainly works with the medical profession.

It is a gratifying fact that not only in Minnesota, but throughout the nation, the leadership of the tuberculosis association and the direction of its policies is vested in the medical profession.

It is not an overstatement to say that the Christmas Seal sale supports a cause to which the physician logically owes support.

Buy generously of the holiday stamps which finance a year-around campaign of education to prevent disease.

N. O. PEARCE, M.D.

Free Medical Journals

A gifted editor* and vigorous stylist pays tribute under the above caption to piratical practices devised by vendors of proprietary remedies to have their advertisements read. Once the method is pointed out it is all pathetically simple. A brochure opening up with admirable historical

and pictorial references to the masters of the guild eases through a "time-worthy" digest of excellent articles from the best of journals and finishes up luridly with something savoring of subumbilical humor adduced presumably to "tone and sedate."

So many of these abound that no doctor needs further identification marks. The flood is on the increase. It is obvious these are not "free"; some one gets paid for them; and rumor has it, paid very well. Certainly the men and journals submitting to this piracy get nothing except the opportunity to make possible commercial exploitation of remedies to which our reputable journals have long closed their pages and the A. M. A. has set up an expensive laboratory for standardization.

Every editor admittedly is interested upon more than purely ethical lines. In so far as any worthwhile journal needs support from its advertising pages it must view with suspicion the trick of securing the attention of medical readers by a combination of effective journalism, judicious intersprinkling of financial and economic advice, due abuse of bankers and praiseworthy comments apropos of the thankless job of being a doctor's wife!

The business acumen of these exploiters does not deserve the criticism which we do for submitting to the whole affair. We should, as County Societies, agree and have our secretaries send a roster of our membership, demanding of these spurious second-hand vendors to take our names off their mailing list forthwith.

E. L. T.

The Hearing Survey and the Doctor

With the advent of hearing tests that are being conducted throughout the schools of the state, it is well for us to consider how best we can assist this worthwhile project. We all know that the time to correct difficulty in hearing is in the early stages before permanent changes have taken place. We also know that patients seldom seek advice early, especially if only one ear is affected.

The tests that are being made are mostly with the audiometer, by means of which groups of children may be tested at one time. The hearing of each ear is taken separately and a record

*"F. S." in the *American Journal of Digestive Diseases and Nutrition*.

is made of each child's ability to hear the words that continually become fainter as they come from the audiometer. If there is a marked loss of hearing in one or both ears, the parents are notified and they are requested to take the child to the family doctor. Parents, generally, do not want to believe there is anything wrong with their child, except that he or she is a little inattentive. They may, however, decide to take their child to their family physician, and it is important to start them on the right track at their first visit.

To check the hearing, one ear should be tested at a time, the patient either closing the eyes or turning away from the doctor. One ear may be closed by the patient's moistened finger in the meatus or by pressing the tragus cartilage.

In a fairly quiet room a patient with normal hearing should readily hear a low whisper or a low conversational voice at twenty feet. This, of course, varies in case other noises interfere. A patient with marked obstructive deafness may hear the high whispered note better than the low conversational tone, while one with nerve deafness would hear the low tones better.

A thorough examination of a patient with poor hearing should include: (1) inspection of the external auditory canals for any obstruction such as ear wax, foreign body, pus, new growth, or anything that will prevent the sound waves from reaching the middle ear; (2) examination for the presence of adenoids because of their proximity to the Eustachian tubes; (3) ruling out the tonsils as a possible focus of infection or the cause of frequent colds; (4) inspection of the nose for evidence of sinus infection or obstruction to breathing.

In advanced hard of hearing cases, it is advisable that the patient have not only a local but a general physical examination, including urine and blood examination and an investigation as to possible deficiency in some glandular secretion.

There are, of course, cases of hopeless progressive hereditary deafness in which no form of treatment will be of avail, but no case should be considered hopeless until a thorough examination has been made. When serious deafness has arrived, resort to lip reading is recommended.

In conclusion, I again request your careful consideration of any patient coming to your office with a history of hearing difficulty, whether it has been noticed by himself, his parents, his teacher or the nurse who has conducted his first hearing examination. If this is done, the progress of many cases of failing hearing will be checked, and we will have broadened the field of preventive medicine.

E. R. BRAY, M.D.

MAHLON LOCKE—FOOT TWISTER EXTRAORDINARY

The publicity accorded to Mahlon Locke, Canada's newest contribution to faith healing, has aroused great interest among both the medical profession and the public. The profits to be derived from the sale of shoes to persons suffering with chronic diseases affecting the bones and joints has induced many a department store to add a Locke department to its shoe section. Disciples of the Canadian healer journey about with a motion picture film demonstrating Locke himself in action at the shrine in Ontario. The doctor is shown at work, sitting in a swivel chair while human beings come toward him from eight radiating paths to put their feet trustingly in his lap. Either just before or just after he receives the feet he also receives a dollar bill, which is deposited in his pants pocket. He then bends the foot outward and downward and the patient moves on. Some sort of an associate bends the hands of the patients and there are adjacent quarters in which women assistants wiggle the arms, bend the neck hither and thither and bend the back of the patient over a table. It should be obvious to any one that Dr. Locke's treatment represents psychologic suggestion reinforced by the laying on of hands; perhaps in a few instances the pulling of an adhesion such as any masseur might attempt. The activities of Dr. Locke are a burlesque on the scientific practice of medicine. His promotion is a violation of every traditional, ethical tenet! There are some who say that even psychologic relief for the chronic arthritic patient is worth while, regardless of the means by which it is accomplished. The reaction on the scientific practice of medicine and the chagrin and disappointment of those seriously sick do not permit this *laissez faire* attitude. Moreover, many a person who might be benefited by scientifically applied physical therapy and by competent orthopedic surgery is spending hard-earned money to make the long trek to Williamsburg in search of a pot of gold which those at the end of the rainbow are quite consistently saving for themselves. (*Jour. A. M. A.*, October 13, 1934, p. 1153.)

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association

B. J. Branton, M. D.

W. F. Braasch, M. D., Chairman

J. C. Michael, M. D.

Questionnaire

[Each month these columns will try to express briefly, for purposes of the average physician who is going to be questioned as never before this winter, why that same average physician fears and opposes health insurance.]

Organized medicine is opposed to Health Insurance. Why?

The question will be asked you this year, not by social theorists, but by practical politicians, legislators and lawyers.

Why doesn't the practicing physician want some scheme of pre-payment for his services? It will mean a certain income, won't it? It will mean better care for a class of people that isn't getting proper care now, won't it?

These are the questions that will be put to you, Mr. Physician. What are you going to say to them?

You have a deep rooted feeling against these pre-payment insurance plans. Is this feeling based upon prejudice? Is it mere selfishness? Are you afraid, for example, that somebody is going to set your fees for you? You will never have that chance at that rich patient who will pay you those mythical big fees?

Are Your Motives Selfish?

You believe, perhaps, that nobody seriously attributes such motives to you. You are wrong. That is precisely the reaction of a great many laymen to the objections voiced by organized medicine to the Majority Report of the Committee on Costs of Medical Care. What are you going to say to them? If it isn't selfishness, then what is it?

To take one of the questions cited above:

Will Insurance Bring Better Care?

Question: Will health insurance bring better medical care to the class of people who are not getting proper medical care now?

Answer: The quality, amount and type of medical care available to all classes of persons in the United States today is the best in the world. That is true in spite of the fact that there are many problems connected with the delivery of medical service in this country that must be solved.

In all European countries without exception that now have the insurance system of medical care, the quality of care is inferior and unsatisfactory and it is purchased at an exorbitant expenditure of the government funds.

In some of these countries, notably in England and Germany, from whom the most information comes to us, the present situation may be better for some classes than the complete absence of facilities that may have existed before health insurance. That does not mean that health insurance should be recommended to solve the American problem. Why?

Sure to be Politics

Health insurance that is supported, even in small proportion, by tax money is bound to be under political control. There is no way out of that.

It is *impossible* to draw upon government or state or even local funds on any such scale without the creation of political appointments and bureaus for administration. Anyone who believes anything else is an impractical visionary. He has only to look about him at other welfare activity that is government supported.

If political control and manipulation slows up and misdirects expenditure of funds for housing or farm relief or public works, can we expect for a moment that it will not slow up and misdirect the care of the sick?

Medical and hospital care for the sick is sometimes expensive under our present system owing to the actual cost of elaborate modern methods of treatment, but no charge of graft has ever been laid against it.

Can we believe that medical and hospital care of the sick will be carried on without graft when politics enters this field too? Hardly. The cost of medical care, vastly more than at present, will then have to bear, also, the cost of the necessary politics, a heavy new bill for the taxpayer to pay.

Health Not Improved

Question: But suppose some politics is mixed up in the administration of the insurance scheme. Suppose it does cost the taxpayer more money. If it should actually provide medical care for those who aren't receiving it now, wouldn't it be worth the trouble for the future health of our nation?

Answer: Perhaps it would, if that were actually the case. But it hasn't worked out that way in Germany or England or any other country where health insurance has been in operation for years.

There is still sickness in all of those countries, more, by statistical record, than there used to be. The morbidity rates in the United States are the lowest in the world.

In fact there is not only a great deal of real sickness, but there is also a great deal of malinger in those European countries. Those who are paying continuously for health insurance are naturally disposed to get their money's worth in medical service. When cash benefits for disability are involved, as they are in the American Association for Social Security's model bill, the incentive to malingering is overwhelming.

At the same time, nothing but education will bring people to the insurance doctor any more than to their private physicians at the time when it is really possible to prevent serious illness. It is one thing to make medical care available without cost to the people. It is another to teach them to make intelligent use of the privilege.

American Standards Best

Most American schemes for health insurance make it a point to provide for free choice of physician for the patient and also for preservation of the confidential physician-patient relationship.

It is the experience in other countries, however, that both these important adjuncts to our American system of medical care are greatly endangered if not entirely lost under health insurance.

The physician's records are open to the inspection of bureau heads and administrators, which means that they are open to employers, too.

The insurance doctor is almost certain to be forced to carry a larger patient load than he can adequately look after and his treatment of each case will be determined as much by rules and regulations of the lay people who are managing the project as by the needs of the patient.

It has worked out that way in England and in Germany. Is there any reason to suppose that Americans will be more fortunate?

Is It Satisfactory to Physicians?

Question: But I thought that health insurance was working very satisfactorily to the physicians, at least, in England.

Answer: Not if the actual number of physicians registered to participate in panel practice is any sign. Only 40 per cent of the physicians are engaged in that kind of practice today and the salaries of those who are registered for the panel are not more than \$2,000 a year. In many cases they are much less. In England, of course, panel practice is an established fact now. It is so firmly entrenched in the English political system that it is no longer possible to consider any other form of medical practice there. This is a major menace to the adoption of any form of state controlled medicine.

In America we have the chance today to work out practical schemes for assisting the hard-pressed patient to pay for his own medical care when the emergency arises. Several such schemes are now being tried out in Detroit and elsewhere. In them we have our best chance today to insure good medical care to all classes of people, at the same time preserving the independence and self-respect of both patient and physician and the progress of medical science and practice in America.

Doctors Will Advise

The letter printed below from Mr. Edwin E. Witte, executive director of the President's Committee on Economic Security is in response to a letter written by Dr. E. A. Meyerding, Secretary of the Minnesota State Medical Association, at the direction of the Council, to the President of the United States. This letter requested a hearing for the practicing physician, as represented by

organized medicine, before any plans for distribution of medical care were formulated for submission to the President by the Committee.

The telegram from Dr. Olin West of the American Medical Association shows the result.

Physicians will await with interest the statement asked for by Dr. West.

Here is Mr. Witte's letter.

COMMITTEE ON ECONOMIC SECURITY

Walker-Johnson Building
1734 New York Avenue, N. W.
WASHINGTON

November 2, 1934

Dr. E. A. Meyerding,
Secretary,
Minnesota State Medical Association,
11 W. Summit Avenue,
St. Paul, Minnesota.

Dear Dr. Meyerding:

The President has asked us to acknowledge your letter of October 24 in which you suggest that this Committee, in consideration of medical problems, give representation to the American Medical Association. In reply, allow us to say that the Medical Advisory Committee which we are organizing will have among its members the President of the American Medical Association, also several of its ex-presidents. All members of this committee, are eminent physicians and surgeons, whose names, when announced, will show that we are having most competent professional advice. Permit us also to say that when this committee was first organized, we advised the American Medical Association that we would appreciate its coöperation. More recently, we have asked that it make available to us the results of the research carried on by its Bureau of Medical Economics and we have had its assurance that it will do so. Only this week we talked with Dr. West, the secretary and manager of the Association. We suggested that he present any views he might have to offer on the subject of health insurance and promised him that if he would do so we would see that his views were submitted to each member of the committee. Dr. West assured us that he would do this.

Appreciating your interest in the work of this committee and assuring you that we have no intention of making any recommendations without consulting the profession, we are

Yours very truly,
COMMITTEE ON ECONOMIC SECURITY
Edwin E. Witte, Executive Director.

Dr. West's message:

November 19, 1934

Dr. E. A. Meyerding,
11 West Summit Avenue,
St. Paul, Minnesota.

Medical Advisory Committee of Committee on Economic Security adjourned after three days meeting without proposing any plan. Committee asks for further time for study. Leland and Simons of our Bureau of Medical Economics made members of Technical Staff of Committee. Best available advices indicate that official action on sickness insurance will be deferred. We have asked Washington for official statement to be printed in Journal.

OLIN WEST.

Danger in Washington

Judging by newspaper reports of the last election, the Medical Practice Act of the State of Washington stands in grave danger of disastrous tampering, if not of repeal.

The Democratic platform for the state, drawn up last May, contained the following party "plank" as quoted in the August issue of *North-west Medicine*:

"We propose such change in the laws relating to the laws of healing as will put all licensed practitioners on an equality before the law."

Thus the Democrats. Immediately the Medical Practice Act became a party issue in the elections.

The Republicans drew up the following party plank in June:

"We regard the health of the people of our state to be of paramount importance," said the Republicans. "Therefore, the Republican party stands for the high standards of public health and medical care and for no further changes or reductions in the standards established under the present Medical Practice Act."

Reports of the Washington elections show a Democratic landslide in the state House of Representatives and the state Senate. Other state offices did not come up for election this year.

This news item shows the danger when medicine is allowed to become a political football.

It shows also:

1. The necessity for educating the public that the present Medical Practice Act, as far as Minnesota is concerned, is undoubtedly our greatest safeguard for the public health. We should inform the public of the great dangers involved in changing that act to lower its standards.

2. The necessity for close organization of medical association members in each state and county.

No Group Stands So High

Says Dr. Edward H. Ochsner, Chicago, in a recent issue of the *Illinois Medical Journal*:

"I believe that medicine today stands the highest in the estimation of the American people of any group in society. I am not pessimistic at all about the opinion of the public. If you look through the magazines and the daily papers, and look at the reception that was given the majority report of the Committee on the Costs of Medical Care and then look at the reception given the minority report of the same committee, you will

find my contention substantiated. Almost every line that was written in American journals and newspapers was commendatory, not of the main report, but of the minority report. I repeat that there is no group in American society today standing so high and having such a splendid record for achievement as the medical profession. Great human crises such as that we are passing through today are apt to bring out a host of nostrum cures. The medical profession should go right along and mind its own business and not attempt any of these nostrums. I think the people are getting 'fed up' on flamboyant advertising. One needs but to listen to the radio for one single evening in order to be convinced of this. One great fault of the American people is faddism, but when the fad goes too far it defeats itself, just as the streptococcus or staphylococcus dies off in its own excrement. The thing for the American physician to do is not to get panicky, to sit tight and keep on in the dignified way that has been theirs throughout history, and they will win out."

Diabetes Book

Orders for extra copies of the diabetes booklet, "Diabetes—How to Make It Harmless," published by the Committee on Diabetes of the Minnesota State Medical Association, are coming in fast to headquarters at 11 W. Summit Avenue, Saint Paul.

Each member of the association has already received one copy without charge and all are at liberty to secure as many more as they can use for a charge of ten cents a copy. Cash should accompany each order.

Orders from other states are conspicuous in the mail.

This booklet is designed by the committee for the assistance of the doctor in issuing instructions to his diabetic patients.

Proposed Health Insurance Legislation

Are We Ready for It?

The first Health Insurance bill of the year is now ready for 1935 legislatures.

This bill is the work of the American Association for Social Security. Note its distinguished list of officers: Miss Jane Addams, Bishop Francis J. McConnell, Mr. Alfred I. DuPont, Mr. Glenn Frank, Mr. John A. Lapp, Mr. I. M. Rubinow, Mr. Herbert S. Bigelow.

It might look as though this noted group of laymen had stolen a march on the President's Committee on Social Security, which is also

studying the problem of delivery of medical service to lower income groups. It is well to note, however, that the same Edwin Witte who is secretary to the President's Committee assisted in drawing up this bill.

The President's Committee may or may not recommend a system of health insurance for inclusion in legislation for the national Congress this year.

The Association for Social Security is ready to submit its bill to Congress and to every state legislature in the country now. That the bill will get a serious hearing in some quarters seems inevitable in view of the temper of the times. Whether it will actually become law in any quarter depends very much upon the interest and activity of the medical profession.

The medical profession had no representation of doctors, who ever practiced medicine for a living, in the deliberations of the Association.

Following is a résumé of the bill, together with comments on it by Dr. H. M. Johnson of Dawson, chairman of the Committee on Public Policy and Legislation of the Minnesota State Medical Association. *Read them!*

Study This Bill

Every medical man in the state should know what these representative non-medical humanitarians want to do about the practice of medicine in America.

Every medical men in the state should know, also, what such practical medical men of affairs as Dr. Johnson think about the plan, and make up their minds accordingly.

Legislators are sure to be well informed about what the noted and well financed lay backers of the proposed legislation think about the matter. Their one-sided propaganda is unlimited.

It rests with the doctors—with you—to acquaint these same legislators and congressmen with the medical point of view. *Study this bill.*

The Proposed Bill

The bill was drawn up by Professor H. A. Gray of the New York University Law School. Only two doctors, Dr. Haven Emerson and Dr. Alice Hamilton, neither one of whom represents the viewpoint of the practicing physician, served on the advisory committee. Mr. Edwin E. Witte, executive secretary of the President's Committee

on Economic Security, helped at the job. So did Mr. Abraham Epstein of New York, who is executive secretary of the association.

Briefly:

1. The bill is designed for all employed persons and their dependents except "those employed at other than manual labor who are receiving in excess of \$250 *monthly*" and their families and dependents. (Exceptions are made for farm laborers and for employees in the personal or domestic service of an employer having less than three employees engaged in such service.)
2. For all of these, with the above exceptions, Health Insurance is *compulsory* as provided in this bill.
3. The plan is to be financed by a fund to be placed in the custody of the State Treasurer. This fund will be made up of
 - a. Three per cent of the employee's wage to be deducted by the employer
 - b. One and one-half per cent of the payroll to be paid by the employer
 - c. One and one-half per cent of the payroll to be paid by the State
4. The fund thus built up is to provide
 - a. *Cash benefits* for disability
 - b. *Maternity benefits*
 - c. *Medical benefits* (mentioned last in the bill)
5. Medical benefits will include
 - a. The services of a general medical practitioner and, at his own prescription—
 1. General and special hospital treatment
 2. Nursing care
 3. The services of a surgeon or other specialist, et cetera.
 4. Services of laboratories and clinics
 5. Services of a dental practitioner for specified limited treatments

6. Physicians, hospitals, et cetera, are to be selected by the patient from a list of those willing to serve under the terms laid down by this political group that would then control our profession.
7. Physicians are to be paid in accordance with arrangements made by each Local Council (see accompanying diagram of set-up).
8. The general state set-up includes State, District and Local offices (see diagram), with employers, employees, the public, doctors and dentists represented in each.
9. Special arrangements are provided in the bill for persons having up to \$5,000 a year, not covered in the proposed act, to come under its benefits on a voluntary basis.
10. Authority is reserved to the Commission to erect hospital and other facilities in districts where adequate facilities are lacking.

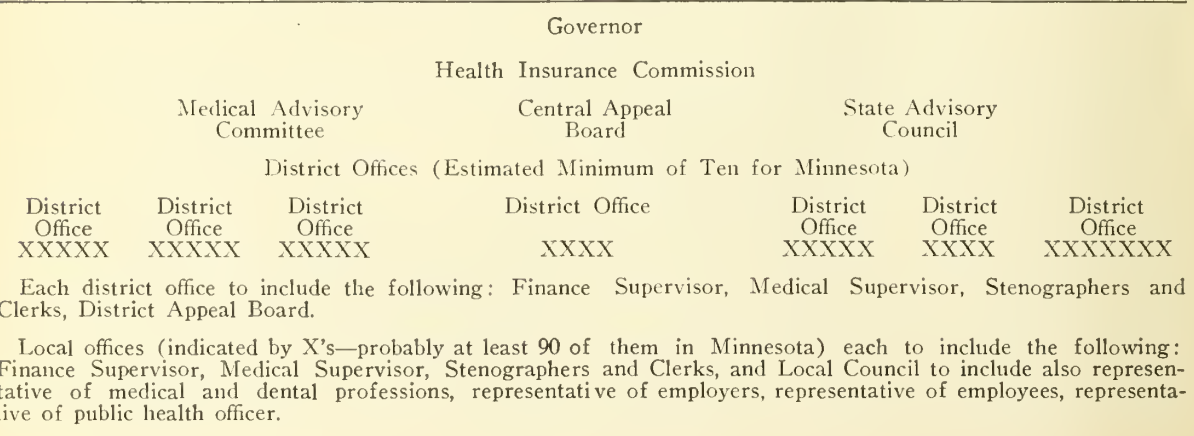
Administrative Costs

The diagram is a schematic representation of proposed organization for administering Health Insurance under this bill.

The table below gives a very moderate estimate of the administrative cost of the plan. It is far below what the minimum salary cost would probably be. Salary estimates are *not* provided in the bill. These figures represent our own, very conservative guess as to the minimum expense of this one item in the cost of health insurance to the state and its beneficiaries.

These estimates do not cover the cost of medical, hospital, nursing and dental care nor the various benefits provided for in the bill.

It is interesting to note that the set-up as proposed would doubtless cost more than twice as much for salaries alone as was spent from July, 1933, to August, 1934, a period of fourteen



months, for the entire medical and dental care, and for drugs, by the State Emergency Relief Administration.

OUR ESTIMATE OF THE MINIMUM ADMINISTRATIVE
COSTS OF STATE HEALTH INSURANCE AS
INDICATED IN THIS BILL

Fulltime state officials		
5 Administrators @.....	\$2,400	\$12,000
5 Secretaries @.....	1,200	6,000
25 Clerks @.....	900	22,500
Fulltime District officials		
10 District Medical Supervisors @.....	1,500	15,000
10 District Medical Supervisors @.....	1,800	18,000
20 District Clerks @.....	900	18,000
Fulltime Local Officials		
90 Local Finance Supervisors @.....	1,200	108,000
90 Local Medical Supervisors @.....	1,500	135,000
180 Local Clerks @.....	900	162,000
		<hr/> \$496,500

Note: The above does not include rent, postage, office supplies, mileage, et cetera., nor per diem salaries to members of appeal boards, et cetera.

This Model Bill

By H. M. JOHNSON, M.D.

This proposed Model Health Insurance Bill is a set-up evidently written by people who have only one point of view. The plan is apparently machine-controlled all the way down. Appointments doubtless would be political. The medical men have scarcely anything to say. Once in a while, perhaps, a doctor would be put on as an advisory member of some committee.

What these socialistically-minded people are trying to do is beyond all comprehension. In order even to begin to understand it, you must read the whole bill and study it. Study it in such a way that you can inform your legislators and congressmen about it. You might also try to get them to read parts of it for themselves after you have checked it through. If enough men want it, copies will be sent out soon, with an analysis of it.

Elect Sensible Men

We know the trend of the times. We know that something of this nature may happen. But there are two sides to this question. Every medical man should be familiar with the various methods of practicing medicine in countries throughout the entire world. We should ally ourselves and be ready to fight for what is best. There is no better way of starting such a campaign than by seeing that only good and sensible men are elected to both the state legislatures and to congress. With such men representing the public, we do not need to fear any health legis-

lation of this vicious type. I have not yet seen a health insurance plan of which I approved. We should assume leadership in any plan agreed upon by organized medicine.

Like SERA

Remember that this set-up is very much like the one proposed by the SERA in Minnesota. And further remember that, due to this last plan, the practice of medicine has been set back 30 years because, for one thing, hospitalization of the poor has been prohibited. This is just one illustration of many to show how progress is retarded in the practice of medicine by this set-up. Who will suffer? The poor . . . and the doctor, too, since his ideals for practicing better and better medicine are thus interfered with.

Many of those who are advancing this bill are not trained. After all, a professional man is not made overnight; years of hard study are required to fit him for his career. Anyone who has sufficient capital can become a grocer in a few hours, but it is not so with a doctor or dentist. The functions of the professional man cannot safely be assumed by laymen. For example, judging whether or not a patient needs a doctor's care is a function belonging solely to a physician. A social worker is entitled only to look into the patient's financial condition and determine whether or not he deserves to be on relief. Any further action on his or her part is attempting to practice medicine without a license.

There never was a time when professional organization was more urgently needed. If we want to protect ourselves, we must be prepared to fight. For years past, I have predicted that we might look for something of this kind to come. Gentlemen, it is now on our doorstep. What are we going to do about it?

Interested in Health

There are close to 100 state and national organizations concerned to some extent with the health of the people of the United States.

Some of these are official and some non-official, as you will note by the list below. All profess a direct interest in the type, quality and distribution of medical care in the United States.

Only a few of them are physicians' organizations and many are wholly lay organized with

no professional knowledge whatever of the problems of medical care.

This list was compiled by Dr. E. C. Hartley, of Saint Paul, and it has been used with great effect by Dr. F. J. Savage, of Saint Paul, whose term as president of the Minnesota State Medical Association expires next month, in talks on state association work before affiliated county medical societies.

The list:

OFFICIAL NATIONAL ORGANIZATIONS

1. White House Conference of Child Health and Protection
2. U. S. Dept. of Agriculture
3. U. S. Dept. of the Interior—Office of Education
4. U. S. Dept. of the Interior—Office of Indian Affairs
5. U. S. Dept. of Labor—Children's Bureau
6. U. S. Public Health Service

The Foundations

1. The Rockefeller Foundation
2. The Milbank Memorial Fund
3. The Commonwealth Fund
4. The Duke Endowment
5. The Couzens Fund
6. The Rosenwald Fund

Other Organizations

1. State Health Departments
2. City Health Departments
3. County Health Departments

STATE-WIDE ORGANIZATIONS WITH HEALTH WORK INCLUDED IN THEIR PROGRAMS

Official Organizations

1. State Department of Health
2. State Board of Control
 - a. Children's Bureau
 - b. Bureau of Research
 - c. Division of the Blind
 - d. Division of Tuberculosis
3. State Department of Education
 - a. Division of Physical and Health Education
 - b. Division of Re-education and Placement of Disabled Persons
4. University College of Agriculture, Forestry and Home Economics
5. Minnesota State Sanitary Conference
6. Bureau of Indian Affairs (U. S.)
7. State Livestock Sanitary Board
8. State Department of Agriculture, Dairy and Food
9. State Board of Examiners in Basic Sciences
10. State Board of Medical Examiners

Voluntary Organizations

1. State Medical Association
2. Women's Auxiliary State Medical Association
3. State Dental Association
4. Women's Auxiliary State Dental Association
5. Minnesota Public Health Association
6. American Red Cross
7. Junior Red Cross
8. Minnesota Association for Crippled Children, Local Chairman
9. Federated Women's Clubs, Welfare Division
10. Minnesota Education Association
11. Parent Teachers Association
12. American Legion and Auxiliaries
13. Shriners
14. State Organization for Public Health Nursing

4. Insurance Companies
5. Industrial Organizations
6. School Health Services

NON-OFFICIAL NATIONAL ORGANIZATIONS

1. American Association for Labor Legislation
2. American Association of Medical Milk Commissioners, Inc.
3. American Association of School Physicians
4. American Chemical Society
5. American Child Health Association
6. American Epidemiological Society
7. American Heart Association
8. American Hospital Association
9. American Institute of Park Executives & American Park Society
10. American Medical Association
11. American Public Health Association
12. American Red Cross
13. American Soc. for Control of Cancer
14. American Social Hygiene Association
15. Conference of Embalmers Exam. Boards of U. S.
16. Conference of State & Provincial Health Authorities of North America
17. National Boards of Medical Examiners of U. S.
18. National Committee for Mental Hygiene
19. National Comm. for Prevention of Blindness
20. National Child Welfare Association
21. National Conference of Nomenclature of Disease
22. National Conference of Social Work
23. National Dairy Council
24. National Funeral Directors Association
25. National Health Council
26. National Hospital Day Committee
27. National Organization for Public Health Nursing
28. National Safety Council
29. National Society of Penal Information, Inc.
30. National Tuberculosis Association
31. The Committee on the Costs of Medical Care

Local Boards of Health

Child Welfare Boards
Child Welfare Boards
Child Welfare Boards
Child Welfare Boards

Local School Boards

Farm Bureau
Local Health Officers
Indian Agencies

District and County Association
District and County Association
District and County Association
District and County Association
County Public Health Association
County Chapters American
Local Chapters Red Cross
Through Kiwanis, Rotary Clubs
District, County and Local Clubs
District Divisions
District and Local Association
District and Local Posts

Seen By The Secretary

Being the Log of the Month of a Medical Executive

Monday, October 22—Lunched with Benjamin E. Youngdahl, Director of Human Relief for the State Emergency Relief Administration, to talk over problems of medical relief.

A new fee schedule is now in process of formulation. It has been placed by the Executive Committee of the Council in the hands of the Committee on Public Policy and Legislation.

Tuesday, October 23—President-elect W. A. Coventry came down to St. Paul headquarters from Duluth this morning. His 1935 committee list is now tentatively completed, but his work as president of the Association has scarcely begun. His speaking engagements alone will keep him busy next year.

Friday and Saturday, October 26 and 27—At Deerwood Sanatorium, Deerwood, for a Tuberculosis Institute. Dr. E. G. Hubin was host and thirty doctors attended. This was a very successful institute and an excellent example of the postgraduate work carried on jointly by the Minnesota State Medical Association and the Minnesota Public Health Association. Dr. J. A. Myers of the University of Minnesota and Dr. S. E. Slater of the Southwestern Sanatorium at Worthington conducted the institute.

1935 Meeting

Tuesday, October 30—To Philadelphia for the Interstate Postgraduate Medical Association meeting.

It is the plan of the Council to make our Twin City medical meetings greater than ever. And this is the year to do it. When will we have the chance again in Minnesota to bring such men as Dr. Harvey B. Stone of Johns Hopkins, Dr. A. A. Cushing of Boston, Dr. George H. Whipple of Rochester, N. Y., and Dr. Earl B. McKinley, Dean of George Washington University, to Minnesota all in one year? Dr. Whipple is the 1934 Nobel Prize winner for his work on anemia.

These men and others are likely to be available to us because of the American Association for the Advancement of Science meeting which convenes the same week at the University.

Saw Dr. Ward of the A. A. A. S. on the trip. Here are his proposals for the meeting: That Tuesday morning's session should be a joint session of his association with the medical association; that Monday and Tuesday nights be devoted to joint sessions of the associations. The scientific association holds its own sessions only in the morning and all its people will be free to attend the medical association meeting with reciprocal admittance buttons in the afternoon.

Dr. John Fulton of Yale, and Dr. Max Cutler of Chicago are on the tentative schedule for the meeting, also, and the prospect is brighter than ever before for a brilliant Minnesota meeting.

Negotiations for housing the meeting are still under way. They have run into difficulties on the score of costs, a matter which will doubtless be ironed out satisfactorily within a few days.

One other item of advance news on the meeting should be of interest to every one of us in Minnesota. We are practically assured of the exhibit showing the experiments by Dr. L. G. Rowntree of Philadelphia and his associates with the thymus and pineal extracts of Dr. Adolph Hanson of Faribault. This exhibit was a center of interest at the interstate meeting. The report of the experiments printed in the *Journal of the American Medical Association* recently received newspaper comment all over the country.

Tuesday, November 13—Went to Faribault in the afternoon to speak to a joint session of the Council of Parent-Teacher Associations and the Women's Auxiliary of the Rice County Medical Society.

Here is an excellent example for women's auxiliaries elsewhere to follow. Relations between doctors' wives and such groups as parent-teacher associations should be very close. Auxiliary members can often do more than medical advisers to guide the health policies of these groups.

Friday, November 16—Conferred with Dr. W. A. Dvorak and Dr. Irwin A. Epstein of the Oral Hygiene Committee of the Minnesota State Dental Association. These dentists are keenly interested in the joint problems of professional organizations. They are considering the inauguration of services like those that have been carried on so successfully by the medical association, particularly our news and radio services. Dentists and doctors should be of mutual assistance to each other. They have much in common. Dinner in the evening, with twenty-five roentgenologists and other medical men interested in problems connected with the use of x-ray in public health work. This is a new development, comparatively speaking, in public health work and requires careful handling by all concerned.

Saturday, November 17—Dinner with the 1935 Committee on Scientific Assembly, first meeting. Only tentative plans can be made now for the 82nd annual meeting. When the meeting halls are finally determined upon, the committee will be ready to work.

Monday, November 19—Met first with the Executive Committee of the Hennepin County Medical Society, and then spent several hours going over possibilities for holding the meeting at the Minneapolis Auditorium. The cost still looks prohibitive.

Tuesday, November 20—Conferred with Dr. A. S. Hamilton of Minneapolis, on the prospects of the Historical Committee, and spent more hours investigating other possible meeting places in Minneapolis. Adequate space and facilities for the scientific demonstrations which are becoming such a feature of our meetings greatly limits our choice of halls.

Working Together

Thursday, November 22—In Rochester with Dr. Esmond R. Long of the Phipps Institute, Philadelphia. Dr. Long came to Minnesota to speak at the annual dinner of the Minnesota Public Health Association at the Nicollet Hotel, Friday night, November 23. Dr. Long talked at a lay Christmas Seal meeting under the joint auspices of the Rochester Rotary and Kiwanis

Clubs, Wednesday noon, with Dr. C. A. Mayo presiding. At night he talked to a Councilor District medical meeting called by Dr. H. Z. Giffin, Rochester, Councilor. Medical men from all over the surrounding district gathered for this meeting.

Friday, November 23—This was the annual meeting day for the Minnesota Public Health Association with a Christmas Seal Institute occupying the morning and noon luncheon and the annual directors meeting in the afternoon at the headquarters, 11 W. Summit Ave., Saint Paul. Dr. C. H. Mayo, president of the organization, presided at this meeting and at the banquet that followed at the Nicollet Hotel. The close association of the medical and public health associations is never more evident than on these occasions. Directors of the health association figure largely on the council and on the committee of the Minnesota State Medical Association. Thus policies and principles of these naturally allied organizations are coordinated and guided. It is to be noted that this happy situation is not duplicated to the same degree in any other state in the country.

Minnesota State Board of Medical Examiners

Park Rapids Chiropractor Found Not Guilty of Manslaughter

State of Minnesota versus H. E. Jenks

On Tuesday, November 20, 1934, a jury in the District Court of Hubbard County, presided over by Judge Alfred L. Thwing of Grand Rapids, brought in a verdict of not guilty in the case of State of Minnesota versus H. E. Jenks. Jenks was on trial following his indictment by a grand jury of Hubbard County of the crime of manslaughter in the first degree. The indictment followed the death on March 16, 1934, at Park Rapids, of a seventeen year old farm girl, whose death followed the commission of a criminal abortion.

The State introduced the testimony of two boys who testified that they took the deceased to the home of the defendant on or about February 24, 1934, at Park Rapids, for the purpose of having an abortion performed upon her. One of the boys testified that he paid the defendant twenty-five dollars to have the abortion performed. A physician who was called short-

ly before the girl's death, and who had her removed to a hospital at Park Rapids, testified as to the cause of death and to a dying declaration of the deceased that the defendant had performed the abortion upon her.

The defendant, who is a licensed chiropractor, admitted that the deceased had come to his home at about the time mentioned, and that the two boys had also been there, but denied that he was paid any money to perform an abortion and denied also that he performed one. He testified that the only treatment he gave the deceased was a chiropractic adjustment.

The case was tried for the State by Mr. Charles L. Clark, County Attorney of Hubbard County, and the defendant was represented by Mr. Daniel DeLury of Walker, Minnesota, and Mr. Knight B. Wilson of Park Rapids, Minnesota. There was a delay of seven months in the trial of the case due to the disappearance immediately after the death of the girl of one of the State's main witnesses, who later was apprehended in California and brought back to Minnesota for the trial.

Maple Lake Woman Warned Against Misrepresentation

Mrs. Ella Graham, forty years of age, Maple Lake, Minnesota, has been warned by the Minnesota State Board of Medical Examiners to refrain from representing herself to the public as a dermatologist or skin specialist. Mrs. Graham has been traveling about the state taking orders for cosmetics, and an investigation was conducted following her stop at Anoka, Minnesota, where it is claimed she represented herself as a dermatologist and a skin specialist. Mrs. Graham admitted representing the product as having the approval of The Mayo Clinic, which, of course, is an unwarranted statement. Mrs. Graham claimed that the manufacturers of the product had stated to her that the cosmetics were approved by The Mayo Clinic. This was denied by the people who manufacture these articles. Mrs. Graham was advised that any further complaints along this line would result in the matter being taken to court. Mrs. Graham has never been employed by The Mayo Clinic and has no connection whatsoever with the Clinic, and has no right under the Basic Science Law to represent herself as a dermatologist or skin specialist.

The President's Letter

The Bundle of Sticks

Nowhere is the value of the ancient proverb of the bundle of sticks better illustrated than in organized medicine today. I have stated on many occasions that it is my belief that there is more loyalty to our organization, and a better spirit of coöperation with the State Medical Association than ever before, and that the need for such loyalty and coöperation was never greater.

The great foundations, in their majority report, tried to force on the American public a system of the practice of medicine which would have revolutionized and disrupted methods and standards gradually evolved during the past years. The medical profession visualized their economic security jeopardized, and a system of dictation of methods of practice in which they would be taking orders from a powerful lay group of politicians. We need not comment on the result.

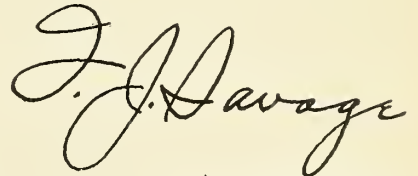
With every session of the legislature, we are faced with demands of hitherto unlicensed cults demanding official legal status, and the recognized cults demanding additional prerogatives. Many medical men believe that during the 1935 session of the legislature, we shall have some form of state medicine proposed for legislative action. Frequently, some apparently harmless looking bill is found, on study, to vitally affect the practice of medicine. Legislative watchfulness this year takes on an added importance in view of our vital interest in what the President's sub-committee on "Provisions for Meeting the Economic Risks of Illness" may propose. This legislative work is not a one-man job—remember the bundle of sticks.

The State Board of Medical Examiners has a record of some eighty-five court convictions since 1927. They have not called upon our association for the \$3,000.00 which was promised

them if they had to have it to continue their work of law enforcement. However, if this law enforcement program is to continue, they must have additional resources. One or two dollars' increase in the annual registration fee would provide the necessary funds, and force Minnesota physicians, who are not members of our association, to help share this expense.

A few years ago, we were greatly concerned with the medical care of the veteran. This year the matter has had but little attention. The chief economic matter with which we have been concerned; has been State and Federal medical care. Your council, as a whole, and its subcommittee, which is authorized to act for them in negotiations with the State and Federal relief administrations, has spent a great deal of time in conference. We have heard, on several occasions, a veiled threat of full time state paid physicians if we cannot arrive at agreement with the State and Federal representatives. You may rest assured that whatever agreements are reached, this group of men have used every effort toward fair play for all parties concerned.

The year has been crowded full of interest and work. The universal coöperation of the officers of our association, committees, and county societies, has made this work a pleasure. Again I wish to thank the members of the Minnesota State Medical Association for the high honor of conferring on me the presidency of this association, and to express my appreciation and thanks for the universal coöperation which I have received.



*President, Minnesota State
Medical Association.*

OF GENERAL INTEREST

Dr. R. A. Curtis, formerly of St. Peter, has moved to Le Center, Minnesota.

Dr. Edward C. Maeder, Minneapolis, and Miss Irene S. Kangas, Saint Paul, were united in marriage in Minneapolis, July 24, 1934.

Dr. E. V. Strand was elected coroner of Washington County at last election. Dr. Strand carried the largest vote of any candidate in the county.

At the Duluth meeting of the Minnesota Society of Internal Medicine, Dr. E. L. Gardner, Minneapolis, was elected president, Dr. Frank J. Hirschboeck, Duluth, vice president, and Dr. C. B. Drake, Saint Paul, secretary-treasurer.

Dr. H. O. McPheeters addressed a joint meeting of County Medical Societies at Estherville, Iowa, on November 15, 1934. He gave a discussion on varicose veins, which was followed by a presentation of cases with demonstration of technic.

Dr. Donald C. Balfour, Rochester, was elected president of the American College of Surgeons at the Clinical Congress held in Boston. Dr. Arthur W. Allen, Boston, was elected first vice president and Dr. John A. Gunn, Winnipeg, second vice president.

Dr. and Mrs. William J. Mayo celebrated their fiftieth wedding anniversary on November twentieth. A reception was tendered Dr. and Mrs. Mayo by members of The Mayo Clinic staff at the Clinic Library, and a family dinner at the Mayo home further celebrated the occasion.

Dr. Paul W. Giessler of Minneapolis gave a lecture on "Weak Feet, Classification and Outline of Office Treatment in Foot Conditions" before the physicians of the Renville County Medical Society at Olivia in October. Following the lecture guests were entertained at the home of Dr. and Mrs. A. A. Passer.

Dr. W. A. O'Brien, Associate Professor of Pathology, University of Minnesota, spoke to the Lakeview Hospital Memorial Staff, November 20, 1934. Dr. O'Brien outlined the duties of the hospital staff, and made many very valuable suggestions, which the staff will endeavor to follow. Dr. O'Brien later made the principal ad-

dress at the nurses graduation, from the Lakeview Memorial Hospital.

The St. Louis County Medical Society recently instructed its secretary to send a roster of the society to several of the "Piratical Free Medical Journals" which pander to advertisers shunned by the Council on Pharmacy and Chemistry of the American Medical Association, asking that the names listed be removed from the mailing list. If this request goes unheeded these journals will be allowed to accumulate at the post office with the penalty of return postage accruing to the pamphleteers.

SPLINT 'EM WHERE THEY LIGHT

Through the efforts of the Minneapolis Regional Fracture Committee and the Minneapolis Surgical Society, coöperating with the Committee on the Treatment of Fractures of the American College of Surgeons, the nine private ambulances of the two private ambulance companies in Minneapolis are now equipped with the approved splints for transportation of fractures of the upper and lower extremities.

The Thomas-Murray hinged splint for transportation of upper extremity fractures and the Keller-Blake hinged half-ring splint for transportation of fractures of the leg and thigh bones are carried on all private ambulances and will be applied by the ambulance attendants under the direction of the attending physician, if present.

The splints will be left on the patient until they are removed by the attending physician at the hospital after the x-ray study has been made. The hospitals will carry an extra supply of these approved and standardized splints for exchanging with the private ambulances as the splinted patients are brought in.

The private ambulance companies are arranging to demonstrate this method of splinting fractures and these splints at all hospital staff meetings so that all members may see just how they are equipped to "splint 'em where they light."



OBITUARY

G. O. Fortney

1880-1934

Dr. G. O. Fortney, well known physician of Zumbrota, passed away at his home, October 25, 1934, following an illness of several months.

Dr. Fortney was born on a farm near Viroqua, Wisconsin, in 1880. He was a graduate of the Viroqua high school and then attended the University of Wisconsin at Madison. After graduating he took a medical course at Rush Medical College, Chicago, where he received his M.D. degree. Later he took postgraduate work at the University of Chicago, the Tulane University, New Orleans, Louisiana, and a special course in eye, ear, nose and throat at Chicago. He interned at the Cook county hospital, Chicago, and also at the La Crosse Lutheran hospital.

After practising in Wisconsin he came to Zumbrota in 1908 and has had a splendid and growing practice since that time.

He was a member of the American Medical Association, state and county organizations. He was also a member of the Masonic order, as well as the K. of P. and Woodman lodges.

He was married in 1902 to Miss Celia Proctor, who survives him, as does also a brother, Clarence D. Fortney, of La Crosse, Wisconsin.

Harry Alfred Halgren

1870-1934

Dr. Harry Alfred Halgren was born in Minneapolis April 30, 1870. His family settled permanently at Watertown in 1877 and it was in the public schools there that he received his early education. Graduating from the School of Pharmacy at the University in 1890, he practiced his profession for three years in Pipestone and Watertown before entering the University of Minnesota Medical School.

Returning to Watertown Dr. Halgren became one of the pioneer physicians of that section of the State and practiced his profession for thirty-five years. In 1905 he founded the Cottage Hospital, the first of its kind to be built in the county. Serving one term as Coroner of Carver County, he was called upon to officiate at a hanging of a murderer at Carver. The gruesome duty of standing at the foot of the gallows waiting for the trap to spring and later pronouncing the criminal dead was an unforgettable experience and caused him to decline the nomination for a second term.

On May 18, 1904, Dr. Halgren was married to Elsie C. Belden, who with two daughters, Ardis Lucile and Neva Harriet, survive him. Afflicted with coronary heart disease the last four years of his life, his death on September 15, 1934, was due to coronary thrombosis. Besides his immediate family Dr. Halgren is survived by a sister, Mrs. Lottie E. Shrader of Huntington Park,

California, and two brothers, Dr. Guy E. Halgren of Minneapolis and Arthur C. Halgren of Watertown.

Dr. Halgren was a member of the Scott-Carver County Medical Society, the State and American Medical Associations. He had been a Mason for many years and the Masonic Quartet of Minneapolis took part in the final ceremonies rendered to one of Watertown's leading citizens. Out of respect, the public school and places of business were closed during the services.

John Trickey Shelland

1872-1933*

Dr. John T. Shelland was born at Morris, New York, June 20, 1872, the son of a Methodist minister, the Reverend J. C. Shelland. The doctor spent his youth in South Dakota, Hutchinson, Montevideo and Minneapolis. He studied medicine at Hamline University and Rush Medical College and began practice at Forman, North Dakota, later moving to Hankinson. Since 1905 he had practiced at Ada, Minnesota, and in that year married Etta G. Carpenter, who in addition to one son, John David, and two daughters, Mrs. Robert Kienetz and Hildred, all residing in Ada, survives him. His father and stepmother live in Minneapolis, the former having reached the age of ninety.

Dr. Shelland took an active part in civic, fraternal and social affairs in his community. Having served several terms as city alderman, in 1921 he was elected mayor of Ada, a position he held six consecutive terms. He was also a member of the city board of health for a number of years and served as chairman of the county public health association. In addition to being a member of the Masonic Order and the Modern Woodmen of America, he was one of the organizers a few years ago of the Ada Rotary Club and served a term as president.

Ada has lost one of its leading citizens and the profession a valuable member.

Ernest Lightfoot Strader

1876-1934

Dr. Ernest L. Strader passed away at his home at White Bear Lake, Minnesota, November 6, 1934, at the age of fifty-eight.

Dr. Strader practiced several years in Harrodsburg, Kentucky, before coming to Minnesota in 1920, when he took charge of a tuberculosis sanatorium first at Cannon Falls and later at Deer River. He retired on account of poor health in 1931 and moved to White Bear Lake at that time.

Dr. Strader is survived by his widow, Mrs. Blanche L. Strader of White Bear Lake, a brother, F. Vaughn Strader and a sister, Mrs. Lee Bassett, both of Harrodsburg, Kentucky.

*Our attention has just been called to the omission in our pages of any record of the death of Dr. John T. Shelland of Ada, Minnesota, which occurred a year ago, November 27, 1933.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

Medical Broadcast for December

The Minnesota State Medical Association
Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 10:30 o'clock every Tuesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of December will be as follows:

December 4—Shortness of Breath.

December 11—Gasoline and Kerosene Poisoning in Children.

December 18—Mental Hygiene.

December 25—(Christmas).

A. M. A. Exhibit

Application blanks are now available for space in the Scientific Exhibit at the Atlantic City Session of the American Medical Association, June 10 to 14, 1935. The Committee on Scientific Exhibit requires that all applicants fill out the regular application form and requests that this be done as early as convenient. Applications close February 25, 1935.

Persons desiring application blanks should address a request to the Director, Scientific Exhibit, American Medical Association, 535 North Dearborn Street, Chicago, Illinois.

Van Meter Prize

The American Association for the Study of Goiter again offers the Van Meter Prize Award of \$300 and two honorable mentions for the best essays on the subject of goiter provided they meet the standards of the award committee. The essays should be based on original research work on the subject of goiter, preferably its basic cause. The prize essay or its abridgment is to be presented at the annual meeting of the Association to be held in Salt Lake City, Utah, in June, 1935.

Competing manuscripts should be in the hands of the Corresponding Secretary, W. Blair Mosser, M.D., Kane, Pa., not later than April 1, 1935.

The first prize of \$300 for the 1934 meeting was awarded to M. A. B. Brazier, Ph.D., B.Sc., London, England, for her essay, "The Impedance Angle Test for Thyrotoxicosis."

First honorable mention was awarded Prof. Ugo Cerletti, Genoa, Italy, for his essay, "Three Years of Experimental Research in the Etiology of Endemic Goiter."

Second honorable mention was awarded D. Roy Mc-

Cullagh, M.D., Cleveland Clinic, Cleveland, Ohio, for his essay, "Studies in Blood Iodine Using a New Chemical Method."

Lyon-Lincoln County

At a meeting of the members of the medical societies within a radius of seventy miles held at Tracy, Sunday, November 11, the speakers were: Frank J. Savage, "Your State Association"; and Mr. George Larson, field representative, "The Several Commissions, SERA and FERA" and "The Duties of the Contact and Advisory Committees." Mr. F. Manly Brist discussed the various questions referred to him by the council, the draft of the insurance bill, also liability of doctors accepting cases under the FERA. Doctor Ridder of Flandreau, South Dakota, felt that some of the questions to be discussed were of more than local importance and honored us with his presence.

H. M. WORKMAN, *Secretary*.

Minneapolis Surgical Society

The Minneapolis Surgical Society will hold its Annual Symposium on Fractures at 7:45 P. M. Tuesday, December 11, 1934, in the Auditorium of the Hennepin County Medical Society.

The following members and guests will take part in the program:

1. Dr. Harvey Nelson—Fracture Disability Estimation.
2. Dr. E. A. Regnier—Fracture of Neck of the Femur.
3. Dr. R. C. Webb—Fracture of Upper End of the Tibia Involving the Knee Joint.
4. Dr. George R. Dunn—Fracture of the Os Calcis.
5. Dr. R. G. Allison (by invitation)—Pathological Fractures.
6. Dr. Willard White—Results in Fracture of the Spine.
7. Dr. A. A. Zierold—Newer Methods of Determining Extent of Traumatic Brain Injury.
8. Dr. George D. Eitel—Fracture Dislocation of the Shoulder.

The medical profession is cordially invited to attend.

F. A. OLSON, *Secretary*.

Olmsted-Houston-Fillmore-Dodge County

The annual meeting of the Olmsted-Houston-Fillmore-Dodge County Medical Society was held November 7. Officers elected were: Dr. A. M. Snell, Rochester, president; Dr. W. B. Grinnell, Preston, vice president; Dr. M. C. Piper, Rochester, secretary-treasurer. The following delegates and their alternates were elected:

Delegates—

Dr. W. F. Braasch, Rochester
Dr. L. W. Pollock, Rochester
Dr. J. E. Crewe, Rochester
Dr. R. D. Mussey, Rochester

Dr. F. D. Smith, Kasson
 Dr. R. V. Williams, Rushford
 Dr. J. W. Helland, Spring Grove
 Dr. M. C. Piper, Rochester

Alternates—

Dr. A. H. Sanford, Rochester
 Dr. P. A. O'Leary, Rochester
 Dr. George Joyce, Rochester
 Dr. W. W. Walters, Rochester
 Dr. D. E. Affeldt, Kasson
 Dr. C. M. Tierney, Harmony
 Dr. J. A. Malerich, Caledonia
 Dr. H. K. Gray, Rochester

The meeting was preceded by a dinner at the Congregational Church, with 140 members and guests present. Mr. Larson, of the State Secretary's office, gave a very interesting half-hour résumé of the SERA projects.

M. C. PIPER, *Secretary*.

Red River Valley

The Red River Valley Medical Society held its fall meeting at Thief River Falls, Tuesday evening, October 30. A banquet was held in the Civic and Commerce Rooms for the members, Ladies Auxiliary, and guests.

The program consisted of the following addresses:

1. The Comparative Value of Tuberculin Tests and Childhood Tuberculosis—DR. W. G. PARADIS, Crookston.
2. Urography with Special Reference to Diagnosis—DR. EDWARD BRATRUD, Thief River Falls.
3. Tumors of the Adrenal: Report of a Case—DR. V. L. EVANS, Thief River Falls.

At the business meeting which followed, Dr. M. O. Oppegaard, a member of the State Legislative Committee, discussed the candidates for election. Dr. C. L. Oppegaard discussed the importance of the County Medical Society committees, and urged early formation of such committees to coöperate with the county relief administrators.

C. L. OPPEGAARD, *Secretary*.

Renville County

The Renville County Medical Society held its annual meeting at Bird Island, November 6, 1934. The following officers were elected: President, Dr. R. S. Madland, Fairfax; vice president, Dr. A. A. Passer, Olivia; secretary-treasurer, Dr. J. Dordal, Sacred Heart; delegate, Dr. R. C. Adams, Bird Island; alternate, Dr. W. A. Brand, Redwood Falls; Member of Board of Censors, Dr. E. C. Gaines, Buffalo Lake.

Mr. George Larson gave a very comprehensive talk on "Federal Relief and Compensation."

Dr. J. S. Holbrook, Mankato, reported on several interesting cases of perforated duodenal ulcers.

Dr. Max Hoffman, Saint Paul, lectured on "The Present Status of Our Knowledge of Pneumonia."

J. DORDAL, M.D., *Secretary*.

Rice County

A meeting of the Rice County Medical Society was held Tuesday, November 27, 1934, at St. Olaf College, Northfield, where dinner was served to members and their wives at 6:30 P. M. in Mohn Hall.

Dr. Roy E. Swanson, Minneapolis, instructor in obstetrics and gynecology at the University of Minnesota, gave an interesting message on "Leukorrhea."

The women were invited to attend a college recital through the courtesy of Dr. O. P. Thorsen.

C. J. PLONSKÉ, *Secretary*.

Southwestern Minnesota

The annual meeting of the Southwestern Minnesota Medical Society was held November 5, 1934, at the Masonic Hall in Fulda.

The following officers were elected: Dr. W. H. Haloran, Jackson, president; Dr. C. R. Stanley, Worthington, vice president; Dr. H. DeBoer, Edgerton, secretary-treasurer.

The following censors were elected to serve for three years: Dr. A. H. Brown, Pipestone County; Dr. C. O. Wright, Rock County; Dr. J. H. Dudley, Cottonwood County.

Drs. Evelyn Gruhlke McLane and Wm. O. McLane of Jackson and Dr. Peter J. Pankratz of Mountain Lake were elected to membership in the society.

Dr. Thomas Lowe, Pipestone, was the guest of the evening and a very fine tribute by the Drs. Brown, McCrear, Sogge and Dolan was given, to which Dr. Lowe made a short response.

Dr. Harry Christianson of Minneapolis spoke on the subject "Some Everyday Problems in Proctology," and Dr. Haynes Fowler, also of Minneapolis, addressed the meeting on "Appendicitis."

E. G. McKEOWN, *Secretary*.

Washington County

The regular monthly meeting of the Washington County Medical Society was held November 13, 1934, at 6:30 p. m., at the Stillwater Club.

Dr. O. J. Campbell of the Department of Surgery of the University of Minnesota talked on the newer ideas of treatment of acute appendicitis, and also on tumors of the breast.

Mr. P. H. Hamilton, Minneapolis, representing the Mead Johnson Company, showed two reels of films entitled "The Physiology of Fertilization in the Human Female."

Dinner was served and Dr. G. F. Brooks, president of the society, presided.

Wright County

The annual meeting of the Wright County Medical Society was held at Buffalo, October 9, 1934.

Officers elected for 1935 were: President, Wm. E. Hart, Monticello; vice president, Verner Johnson, Delano; secretary-treasurer, John J. Catlin, Buffalo. Dr. C. L. Roholt, Waverly, was elected delegate to the state meeting with Dr. O. Grundset, Montrose, as alternate. Dr. A. E. Phillips, Delano, was elected censor for a period of three years.

Dr. J. M. Haycs, Minneapolis, Councillor for the Sixth District, attended the meeting and gave a talk on "Methods of Handling Medical Relief, and Workings of the ERA and SERA." Dr. Harry Christianson, Minneapolis, gave a very interesting talk on "Diagnosis and Treatment of Certain Phases of Proctology."

The Ladies' Auxiliary met with Mrs. J. J. Catlin and at 6 o'clock a dinner was served to the combined organizations.

A Committee on Constitution and By-laws was appointed to study the copies furnished by the State Secretary and to present them for adoption at the next meeting.

Dr. Theodore J. Catlin, who recently completed an internship at the Cincinnati General Hospital and is located at Buffalo, was elected to membership.

JOHN J. CATLIN, *Secretary*.

New Councilor Districts

Several changes were made in the councilor districts of the Minnesota State Medical Association at the Duluth meeting of the Council in July.

According to the new division Goodhue and Rice counties were added to District No. 1. Waseca county, formerly in District No. 1, was transferred to District No. 4. The district now includes the county societies of Freeborn, Goodhue, Mower, Olmsted-Houston-Fillmore-Dodge, Rice, Steele, Wabasha and Winona.

District No. 2 is to remain as it was. It includes Cottonwood, Faribault, Jackson, Martin, Murray, Nobles, Pipestone, Rock and Watonwan counties, comprising the Blue Earth Valley, the Southwestern Minnesota and the Watonwan Medical Societies.

Three counties were added to District No. 3, Kandiyohi, Meeker and Traverse, which also includes Big Stone, Brown, Chippewa, Lac Qui Parle, Lincoln, Lyon, Pope, Redwood, Stevens, Swift and Yellow Medicine. The medical societies of the district are the Camp Release District, the Kandiyohi-Swift-Meeker, the Lyon-Lincoln, the Redwood-Brown and West Central Medical Societies.

With the addition of Waseca, District No. 4 now includes Waseca, Blue Earth, Carver, Le Sueur, McLeod, Nicollet, Renville, Scott, Sibley. The societies are the Blue Earth, Nicollet-Le Sueur, the McLeod, Renville, Scott-Carver and Waseca County Medical Societies.

Mille Lacs, Pine and Sherburne counties were added to District No. 5 and Goodhue and Rice were transferred to District No. 1. The counties of this district

now are Anoka, Chisago, Dakota, Isanti, Kanabec, Mille Lacs, Pine, Ramsey, Sherburne and Washington. The societies of this district are the East Central Minnesota Medical Society, the Ramsey and Washington County Medical Societies.

District No. 6 now includes only Hennepin and Wright counties, both of which have county medical societies. The following counties were transferred from this district—Kandiyohi and Meeker to District No. 3; Sherburne to District No. 5 and Stearns to District No. 7.

Aitkin and Stearns and Koochiching (if the county so votes) have been or will be added to District No. 7. The district includes Aitkin, Beltrami, Benton, Cass, Clearwater, Crow Wing, Hubbard, Morrison, Koochiching (?), Stearns, Todd and Wadena, comprising the Stearns-Benton and the Upper Mississippi Medical Societies.

Douglas county was transferred from District No. 7 to District No. 8, which now includes Becker, Clay, Douglas, Grant, Kittson, Lake of the Woods, Mahanomen, Marshall, Norman, Otter Tail, Pennington, Polk, Red Lake, Roseau and Wilkin counties. The societies are the Clay-Becker, the Red River Valley and the Park Region Medical Societies.

The final disposition as to councilor districts of Koochiching county will wait for a vote of Koochiching county members.

EFEMIST (HART) AND EFEDRON (HART)

In Queries and Minor Notes in The Journal, Feb. 8, 1930, page 430, the formula for Efedron was stated as: Ephedrine hydrochloride Gr. 1; Chlorbutanol Gr. $2\frac{1}{4}$; Sodium chloride Gr. $2\frac{1}{4}$; Menthol Gr. 3; Phenol Gr. 2; Oil of cinnamon Gr. 0.08; Jelly base q. s. ad drachms 5. Efemist, according to the advertising of the manufacturer, contains 1 per cent ephedrine hydrochloride and $\frac{3}{4}$ per cent chlorbutanol, in addition to undeclared amounts of menthol, eucalyptol, phenol and sodium chloride in a "special water and tissue fluid soluble base." Of course, neither Efedron nor Efemist has been accepted by the Council on Pharmacy and Chemistry, nor has the manufacturer requested Council consideration of the products. Under date of March 2, 1934, a circular letter to the profession from the Hart Drug Corporation stated that "editorially 'The Journal of the American Medical Association,' Vol. 101, No. 19, directs attention to the fact that an oily base in ephedrine-containing preparations is deleterious to the cilia of the nasal mucosa" and "Also, in Vol. 102, No. 1, of the same publication, while harmlessness of the long continued use of ephedrine nose drops is shown, attention to the dangers of oil-containing solutions are pointed out." The sources referred to appear among Queries and Minor Notes; they were not editorials. It is obvious that the intention of each article was to point out that oily solutions of ephedrine when used properly are not injurious to the nasal mucous membrane. No comparison was made of water with oily solutions and it was certainly furthest from all intent in either Query and Minor Note even to suggest that the unacceptable proprietary mixtures, Efedron and Efemist, are to be commended or that they are superior to oily solutions of ephedrine. (*Jour. A. M. A.*, May 19, 1934, p. 1701.)

PROCEEDINGS of the MINNESOTA ACADEMY OF MEDICINE

Meeting of October 10, 1934

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday, October 10, 1934. The President, Dr. Archa Wilcox, in the Chair. The meeting was called to order at 8 p. m.

There were sixty-seven members and three visitors present.

Minutes of the May meeting were read and approved.

The scientific program followed.

GASTRITIS, A PHENOMENON OF PYLORIC OBSTRUCTION, AND ITS RELATION TO DUODENAL ULCER

WALTMAN WALTERS, M.D.

and

GERALD T. CHURCH, M.D.

Rochester

Dr. Walters, candidate for Associate Membership, read his Inaugural Thesis on the above subject. Lantern slides were shown. (To be published in MINNESOTA MEDICINE.)

Summary

In microscopic examination of specimens removed from stomachs resected during the course of operations for duodenal ulcer, associated gastritis was found in but few instances. In studies made of obstructing gastric lesions, it appeared that gastritis occurred in association with pyloric obstruction in a high percentage of cases and was absent when pyloric obstruction was not present. To confirm this clinical impression, a group of cases in which there were obstructing carcinomas of the stomach was studied, and microscopic evidence of gastritis was found in 92 per cent of the cases. A study was made of a control group of patients who had carcinoma without obstruction, who were of similar age and distribution by sex, and whose symptoms were of similar duration. Gastritis was absent in 82 per cent of cases. Studies are in progress at the present time, to determine whether gastritis can be caused experimentally, by producing various degrees of pyloric obstruction with fascial bands.

Discussion

DR. F. C. RODDA (Minneapolis): I would like to ask Dr. Walters what we might anticipate in a case of congenital pyloric stenosis? Is there any evidence that we might have an associated gastritis in these cases?

DR. J. A. JOHNSON (Minneapolis): Dr. Walters certainly should be complimented on his presentation. Some very interesting observations have been brought out. I have been somewhat hesitant in doing the extensive resections advocated by some surgeons, both here and abroad. Dr. Walters has clearly demonstrated that gastritis is confined almost entirely to cases that are obstructed. If that is true, then we should accomplish about the same result with drainage and neutralization

of a gastroenterostomy as they do with wide resections. There are undoubtedly many things that should be taken into consideration as causative factors in the production of gastritis. There is a great difference between Americans and Europeans in the mode of living, the type of food and drink, and the customs of eating. If one observes the mouths in most Europeans they are almost universally filthy compared to mouths of Americans. If infection from the mouth is constantly draining into an obstructed stomach it is not strange that many should develop gastritis. For many years in this country there has been constant propaganda for clean mouths. This in itself may have served to limit the number of cases of gastritis.

DR. IRVINE MCQUARRIE (University of Minnesota): This may be a little aside, but I recall as a youngster hearing of a man with some chronic stomach disorder who had on several occasions had his breath get on fire. This summer my attention was called to a paper in the London Lancet, reporting a genuine case of this type and citing others in the literature. Apparently what happens in such cases is that methane and hydrogen gases, which have been generated in the partially obstructed viscus, are ignited when they are eructated at the same time that a lighted match is being applied to a cigar or pipe held in the patient's mouth. I have wondered how common that experience is and if Dr. Walters has encountered any such cases.

DR. A. A. ZIEROLD (Minneapolis): I have been much interested in hearing Dr. Walters' paper this evening, particularly in hearing his report of the material in European clinics. While at Schmieden's Clinic I had an opportunity of going over a good deal of his material and, although the evidence of gastritis appeared to be definite in the gross, I was much less impressed with the microscopic sections. I think most people who have seen Finsterer's material have been impressed more by the extensivity of the operation than by the intensity of the gastritis present. It has been interesting to hear Dr. Walters' reconciliation of the situation by his observation of the development of gastritis following pyloric obstruction. While we have much less material, I, too, have been struck by the frequent occurrence of gastritis in the Surgical Clinic at the Minneapolis General Hospital, and particularly in obstructing carcinoma. We have identified gastritis by the use of the gastroscope and also at operation. Another thing we have noticed is that very definite and demonstrable gastritis often occurs in those who have come for secondary gastric resection.

DR. GEORGE FAHR (University of Minnesota): Dr. Zierold has taken some of the words out of my mouth; namely that part of his discussion in which he mentioned the gastritis one sees following gastroenterostomy. We see this in patients coming back to the hospital, who have had a duodenal ulcer and a competently performed gastroenterostomy; they come back with dis-

tress symptoms, and when one looks through the gastroscope one sees two of the different types of gastritis that have been described by the gastroscopists, and, after putting these patients on what amounts to a Sippy regime, the condition clears up in some cases; not all cases, however. I think there is no question that there often is an abnormal appearance in the gastric mucosa following gastroenterostomy.

DR. A. C. STRACHAUER (Minneapolis): In regard to the incidence of ulcer, it is my opinion that the percentage of occurrence is decreasing. In my own practice, I certainly see fewer cases of surgical ulcer and fewer cases of the complications of ulcer; that is, perforation and hemorrhage. Is this decrease due, perhaps, to better oral and dental hygiene? Has the widespread removal of the tonsil had an effect?

My surgical work is carried on in three hospitals so that I have opportunity to see the surgical cases posted for operation, and it is certainly quite the exception to see cases of ulcer posted for operation in our Minneapolis hospitals. The present economic condition is, I am sure, not entirely responsible for the change. In a period of twenty-five years of observation there has been a definite decrease and nearly complete disappearance of certain surgical lesions that were common in the early years of my practice; *i.e.*, tuberculous glands of the neck, tuberculous salpingitis, and tuberculous peritonitis have practically disappeared. Also, the incidence of goiter has greatly decreased.

DR. RUSSELL MORSE (Minneapolis) (by invitation): From the discussion this evening, the question of gastritis seems to be a question of several problems: (1) what constitutes normal histology of the stomach; (2) the question of habitat; (3) the question of oral hygiene.

I believe that the question of histology is the more important. What constitutes normal gastric mucosa? In 1928 Faber and Lange set up a fairly strict standard of what should be considered the normal histology of the gastric mucosa. They described the tubular gastric glands as normally being closely packed together and separated from each other and from the muscularis mucosa by a minimal amount of interstitial tissue consisting of small blood and lymphatic vessels, a small amount of fine connective tissue, and very few wandering cells. The surface epithelium is of the mucous type of columnar cell and this epithelium also lines the fovea. The interfoveolar sepae are filled with a very fine reticular tissue with very few wandering cells. From our studies of surgical material, we are in agreement with these findings of Faber and Lange. If this standard is accepted as normal, then the evidence of inflammation of the gastric mucosa is a very common finding. The inflammatory changes which we have observed in the gastric mucosa are congestion, edema, and infiltration of the interstitial tissues by various types of leukocytes and wandering cells, and the formation of lymphoid follicles in the base of the mucosa. In the presence of these inflammatory changes there usually eventually ensues an atrophy and gradual disappearance of the specific glands of the gastric mucosa.

DR. WALTERS (in closing): I wish to thank you all

for your discussions. I was very anxious to hear your opinions of this problem. Gastritis is a very important condition, and its relationship to duodenal ulcer is worth continued study by all interested in gastroenterology. If various observers are willing to discuss their studies, we are bound to arrive at some conclusions as to the part it plays in cases of duodenal ulcer. (And, while I would like very much to discuss this further, I think perhaps we had better postpone this because I don't want to infringe on Dr. Sweitzer's time.) I do think that gastroscopic studies will advance our knowledge of this lesion.

MULTIPLE AREAS OF CUTANEOUS GANGRENE FOLLOWING SCARLET FEVER

S. E. SWEITZER, M.D.

Minneapolis

Dr. Sweitzer read a paper on the above subject and showed lantern slides of the case.

Discussion

DR. CARL LAYMON (Minneapolis) (by invitation): I think this case serves to emphasize the fact that, although suppurative adenitis is a common complication of scarlet fever, gangrene of the overlying skin is very infrequent. This type of gangrene should be differentiated from ecthyma gangrenosa usually seen following pustular eruptions such as chickenpox and smallpox.

DR. PAUL O'LEARY (Rochester): It is interesting to note that gangrenous ulcerations of the type Dr. Sweitzer described are encountered following systemic diseases of streptococcal origin; they occasionally appear following erysipelas or in association with scarlet fever. I have been particularly interested in gangrenous ulcerations of this type because of a group of cases which were reported from my service several years ago, in each of which the skin condition was a complication of ulcerative colitis. Although the pathology was essentially that of an ulcerative gangrene, the course of the disease in these patients was more chronic, lasting over a period of years, in contrast to the ulcerations due to acute streptococcal infection which run a shorter course. Although some of our cases presented the Bargen type of colitis, it was not a constant finding. Cultures from the lesions in this group elicited both staphylococci and streptococci. Stookey and a group of co-workers recently reported a similar type of ulceration following erysipelas in which staphylococci were recovered repeatedly in pure culture. In other words, the studies would indicate that both streptococci and staphylococci may produce gangrenous ulcerations in the skin, and the factor which allows these organisms to produce these unusual cutaneous pictures is probably a change in the patient's defensive mechanism as a result of the systemic disease he has just gone through. Accordingly, it has been our experience in the treatment of these patients that efforts directed toward stimulating the defensive mechanism by some foreign protein therapy have been more successful than measures directed toward the local care of the ulcerations.

DR. JOHN BUTLER (Minneapolis): Hutchinson first described this very rare condition, naming it varicella gangrenosa, as he assumed it was always in sequence to varicella or vaccinia. Crocker, and various others, observed similar gangrenous lesions following other diseases such as scarlatina, variola, malaria, typhoid fever, measles and pneumonia. In multiple gangrene of the skin the lesions are usually numerous. I would like to ask Dr. Sweitzer if he considers the lesions in his case due to embolism, thrombosis, or external inoculation of the skin?

DR. ARCH A WILCOX (Minneapolis): Dr. Sweitzer's paper recalled to my mind four cases of gangrene of the skin complicating typhoid fever which occurred in Philadelphia, during an epidemic in 1900, at a time when I was an intern in the German Hospital. I have photographs of these cases and wish to present them at this time. Just prior to the Russian-Japanese War, the Cramp Shipyard of Philadelphia had under construction two battleships for the Russian Navy. A medical corps and full quota of seamen were sent from Russia to man these two vessels. The medical officers manning the boats were of high intelligence, charming socially, and I was much impressed at that time with their linguistic ability. However, the seamen were selected from various provinces in Russia, and on account of the various dialects they appeared to have difficulty in conversing. In general, they presented a low type of intelligence and, not appreciating the principles of sanitation or the niceties of life, they jumped into the Delaware River for a bath. As a result of this activity about sixty cases of typhoid fever developed in the crew and they were brought to the German Hospital. Among these sixty cases we had these four cases of rather extensive gangrene of the skin complicating the typhoid fever and I thought that the dermatologists would be glad to comment on the etiology and pathology of these lesions. They are, undoubtedly, a rare condition, but to me they are interesting as an historical event in my early career.

The meeting adjourned.

R. T. LA VAKE, M.D.
Secretary.

BOOK REVIEWS

Books Received for Review

GYNECOLOGY. Brooke M. Anspach, M.D., Professor of Gynecology, Jefferson Medical College. Fifth Edition. 832 pages. Illus. Price, cloth, \$9.00. Philadelphia: J. B. Lippincott Co., 1934.

NATURE'S WAY. Victor C. Pedersen, A.M., M.D., F.A.C.S. 81 pages. Price, cloth, \$1.00. New York: B. P. Putnam's Sons, 1934.

TEXT BOOK OF PATHOLOGY. Second Edition. E. T. Bell, M.D., Professor of Pathology, University of Minnesota. 767 pages. Illus. Price, cloth, \$8.50. Philadelphia: Lea & Febiger, 1934.

MINOR SURGERY IN GENERAL PRACTICE. W. Travis Gibb, M.D., Consulting Surgeon, City Hospital and Central and Neurological Hospitals, Etc. 429 pages. Illus. Price, cloth, \$5.00. New York: Paul B. Hoeber, 1934.

THIRTY-FIRST ANNUAL REPORT OF THE BUREAU OF SCIENCE. Philippine Islands. William H. Brown, Director of the Bureau of Science. 94 pages. Manila: Bureau of Printing, 1933.

AN ACTIVITY ANALYSIS OF NURSING. Ethel Johns, R.N., Editor The Canadian Nurse, and Blanche Pfefferkorn, A.M., R.N., Director of Studies, National League of Nursing Education. 214 pages. Price, cloth, \$2.00. New York: Nursing Information Bureau of the A. N. A., 1934.

NURSING SCHOOLS TODAY AND TOMORROW. Final Report of the Committee on the Grading of Nursing Schools. 268 pages. Price, cloth, \$2.00. New York: Nursing Information Bureau of the A. N. A., 1934.

THE PATIENT AND THE WEATHER. Volume III of Mental and Nervous Diseases. William F. Petersen, M.D., College of Medicine, University of Illinois, with assistance of Margaret E. Milliken, S. M. 375 pages. Illus. Ann Arbor, Michigan: Edwards Brothers, Inc., 1934.

APPLIED ANATOMY. Gwilym G. Davis, M.D., Late Professor of Orthopedic Surgery and Associate Professor of Applied Anatomy in the University of Pennsylvania. Ninth Edition. 717 pages. Illus. Price, cloth, \$9.00. Philadelphia: J. B. Lippincott Co., 1934.

MATERNAL MORTALITY IN PHILADELPHIA, 1931-1934. Report of Committee on Maternal Welfare, Philadelphia County Medical Society. 143 pages. Price, \$1.00. Published by Philadelphia County Medical Society, 1934.

SYNOPSIS OF GENITOURINARY DISEASES. Austin I. Dodson, M.D., F.A.C.S., Professor of Genitourinary Surgery, Medical College of Virginia, etc. 275 pages. Illus. Price, cloth \$3.00. St. Louis: C. V. Mosby Co., 1934.

RULES FOR RECOVERY FROM PULMONARY TUBERCULOSIS. Lawason Brown, M.D., of Saranac Lake, N. Y. Sixth Edition. 275 pages. Price, cloth, \$1.75. Philadelphia: Lea & Febiger, 1934.

INSTITUTIONAL CARE OF MENTAL PATIENTS IN THE UNITED STATES. John Maurice Grimes, M.D. Four years a staff member of the Council on Medical Education and Hospitals of the American Medical Association. 138 pages. Price, cloth, \$3.00. Chicago: John Maurice Grimes, M.D., 1934.

CATARACT, ITS ETIOLOGY AND TREATMENT. Clyde A. Clapp, M.D., F.A.C.S., Associate Professor of Ophthalmology, Johns Hopkins University, etc. 254 pages. Illus. Price, cloth, \$4.00. Philadelphia: Lea & Febiger, 1934.

MEDICINE MARCHES ON. Edward Podolsky, M.D. 344 pages. Price \$3.50. New York and London: Harper & Brothers, 1934.

A cheerful optimism is to be applauded in these days of general depression and the pages of this book are full of promise that a therapeutic millennium is just around the corner. Pernicious anemia, diabetes, Addison's disease, infection, sterility, malignant growths are made to appear to have been conquered respectively by

liver, insulin, cortin, bacteriophage, folliculin, and the radio knife, but these agents are all under trial with some encouraging results. In spite of insulin the number of deaths from diabetes is increasing and though eight years' trial shows that liver holds pernicious anemia in check, it will be many years yet before it will be safe to talk about cures.

Dr. Podolsky has contributed articles on medical and other scientific subjects to popular magazines as well as to medical journals, and no doubt has non-medical readers in mind when he writes, but because of those lay readers it is a pity that he has so much to say about sexual matters, to which he devotes Part Eight. The distinction between the vicious and the morbid irregularities and perversions based on sexual desire is difficult enough for the highly trained psychiatrist, and the subject should be dealt with only in strictly medical works.

W. DAVIS, M.D.

CATARACT, ITS ETIOLOGY AND TREATMENT.

Clyde A. Clapp. 254 pp. Price, \$4.00. Lea & Febiger, Philadelphia, 1934.

This small volume contains much of the present-day knowledge of the lens. The work is well planned and concisely written. One enjoys reading the text and often wishes the author had not been compelled to condense his material so thoroughly. There are chapters by Ida C. Mann on the development and comparative anatomy of the lens. The author reviews briefly the anatomy, physiology and chemistry of the lens and then discusses at length cataract. After classifying the various types, he discusses their cause. The chapters on operative technic are clear and complete. At the end of each chapter is a bibliography. Near the close of the discussion of many of the subjects the author has inserted a brief account of his personal views. These are so sensible and well reasoned that they add much to the value of this excellent text.

C. W. RUCKER, M.D.

THAT HEART OF YOURS. By S. Calvin Smith, M.D., Sc.D. 212 pages. Illus. Philadelphia: J. B. Lippincott Co., 1934. Price \$2.00.

This book was written for the layman, probably mostly for the layman with heart disease. The author has made every effort to present a hopeful and optimistic point of view. For this reason the book makes easy reading; however, there are so many gross misstatements through the volume that it is a question whether such a book should be placed in the hands of the uninformed layman. In the early part of the book the author makes a great point of the possibility of developing heart disease due to over-indulgence in strenuous exercise in the early years of life. He also stresses the danger of so-called "athlete's heart." The question of whether or not the so-called "athlete's heart" ever occurs is certainly debatable and to stress the danger

of developing heart disease by over-exercise in adolescence seems not to fit in with the facts. One could point out numerous unorthodox and incorrect statements, but only a few of them need be mentioned:

"Rheumatic fever occurring in young adults seems even more prone to affect the heart at that time than in childhood." Anyone who has read the literature on this subject is well aware that the earlier the attack of rheumatism, the more liable is the heart to be affected and that rheumatic fever in an adult person is for the most part a much less dangerous disease.

"The eating of an excess of meat may produce a nephrosis in the kidneys" is another misstatement in this book which speaks for itself.

"Sixty-five per cent of the attacks of angina pectoris that appear in men who are in the forties result from sexual over-indulgence." I didn't *know* that!

"Minor warning signs [of heart disease] such as muscle spasms of a leg which is called intermittent claudication." I was not aware that intermittent claudication had anything to do with heart disease.

"Fainting also may occur in obese persons with impaired hearts or blood vessels when the abdominal aorta is compressed, as in stooping to the floor."

"Incidentally, when this opening between the right auricle and the left auricle does not completely close shortly after birth, there results the phenomena of a blue baby, simply because the blue blood from the right side of the heart passes through the unclosed channel (patent foramen ovale) and mixes with the bright red arterial blood, changing the baby's natural pink hue to a bluish duskiess." The fact is, however, that most cases of patency foramen ovale do not have cyanosis because the pressure in the left auricle is normally greater than the right. Cyanosis occurs usually only as a terminal event.

"Growing pains mean subacute rheumatic fever." This is not true; by far the greater number of children with growing pains do not have rheumatic disease. The discussion of juvenile rheumatism is inadequate and not up to date. The portion on congenital heart disease might better have been omitted.

"A cardiogram is indispensable in any modern heart examination." The cardiogram is of value only in a small percentage of cases of heart disease.

The author has condemned the use of canned vegetables because he feels that such vegetables do not contain the natural vitamins. He stresses the importance of eating only fresh vegetables. Even a superficial knowledge of the recent work done on the method of canning vegetables without destroying the vitamins would have prevented such a misstatement.

A statement to the effect that the majority of "false anginas, as a usual thing, sooner or later will evenuate into true anginas" cannot be agreed with. The above quotations are only a few of the many misstatements that exist throughout the book.

M. J. SHAPIRO, M.D.

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